The Characteristics of the Earliest Levels of Tel Tsaf and the Onset of the Middle Chalcolithic Period in the Jordan Valley, Israel

Danny Rosenberg[a], Jacqueline S. Meier[b], Yaakov Weiss[c], Sonia Pinsky[d], Karolina Hruby[a], Meir Horden[e], Ehud Weiss[e], Hadar Ahituv[a], Ron Shimelmitz[d], Ben Talmor[d], and Florian Klimscha[f]

a Laboratory for Ancient Food Processing Technologies (LAFPT), Zinman Institute of Archaeology, University of Haifa, Israel, drosen@research.haifa.ac.il
b Department of Sociology, Anthropology and Social Work, University of North Florida
c The Fredy and Nadine Herrmann Institute of Earth Sciences, The Hebrew University of Jerusalem, Jerusalem, Israel
d Zinman Institute of Archaeology, University of Haifa, Israel
e Martin (Szusz) Department of Land of Israel Studies and Archaeology, Bar-Ilan University
f Archaeology Division, Department of Research/Collection, State Museum of Lower Saxony, Germany

Abstract

Of the various chrono-stratigraphic entities of the Chalcolithic period in the southern Levant, the Middle Chalcolithic period (ca. 5300–4700 BCE) is the most poorly defined, with most of the relevant data coming from Tel Tsaf. While excavations at Tel Tsaf in the last two decades provide valuable information concerning the site's upper occupational levels, the earlier strata and their material culture are still unknown. Past excavations focused on the later stage of the site's occupation, leaving unanswered questions concerning the transition from the Early to the Middle Chalcolithic period. In order to shed new light on this topic, the current paper presents the results of the renewed research project, which focuses on the earliest occupational levels at Tel Tsaf, coinciding

Danny Rosenberg, Jacqueline S. Meier, Yaakov Weiss, Sonia Pinsky, Karolina Hruby, Meir Horden, Ehud Weiss, Hadar Ahituv, Ron Shimelmitz, Ben Talmor, Florian Klimscha. 2025. The Characteristics of the Earliest Levels of Tel Tsaf and the Onset of the Middle Chalcolithic Period in the Jordan Valley, Israel.
Jerusalem Journal of Archaeology 8: 1–40.
ISSN: 2788-8819; https://doi.org/10.52486/01.00008.1; https://jjar.huji.ac.il

with the onset of the Middle Chalcolithic period. To start defining the characteristics of this episode, we present the archaeological layers, features, and finds uncovered just above the Lisan bedrock. We discuss the results' implications and their contribution to an improved understanding of the Chalcolithic period's broader temporal framework in the southern Levant.

Keywords: Tel Tsaf, Middle Chalcolithic, Early Chalcolithic, Jordan Valley, Lisan

1. Introduction

The Late Neolithic-Chalcolithic transition in the southern Levant has long been at the center of many scholarly discussions and debates regarding chronological, cultural, and regional definitions of archaeological entities (e.g., Gopher and Gophna 1993; Lovell 2001; Blackham 2002; Garfinkel 2009; 2014; Gilead 2009; Gopher 2012; 2019). In the last few decades, several studies have worked to refine the characteristics of this time span, its chronological divisions (e.g., Late Neolithic, Pottery Neolithic, Early, Middle, and Late Chalcolithic), and related cultures. More specifically, much research has focused on the division of the Chalcolithic period, the attribution of its early phases to the Pottery Neolithic or Early Chalcolithic periods, and the existence of the Middle Chalcolithic period (e.g., Garfinkel 1999; 2009; Gilead 2009; Gopher 2012; 2019).

However, these studies resulted in greater variability and confusion regarding periodization and the cultural entities involved. Thus, researchers working on this time span are forced to deal with numerous chronological and cultural terms, such as *Wadi Rabah culture, normative Wadi Rabah*, and *Wadi Rabah variants, Jericho VIII, Post Wadi Rabah Pre-Ghassul* (PoWR-PG), *Qatifian, Tsafian, Nazurian, Besorian*, and *Early, Middle*, and *Late Chalcolithic* (e.g., Gilead 1990; 2007; 2009; Gopher and Gophna 1993; Bourke 1997; Garfinkel 1999; 2009; Yannai 2002; Golan 2006; Lovell, Dollfus, and Kafafi 2007; Getzov et al. 2009b; Gopher 2012; 2019; Lupo and Dayan 2015; Milevski et al. 2015; Milevski, Lupo, and Bischoff 2020). Furthermore, ^{14}C series sometimes complicated our understanding of the chronological relationship between these periods and cultures (e.g., Joffe and Dessel 1995; Banning 2002; 2007a; 2007b; Blackham 2002; Streit and Garfinkel 2015; Gopher 2019; Rosenberg et al. 2023b, Rosenberg, Galili, and Langgut 2023), highlighting the multi-dimensionality of the chrono-cultural puzzle.

Unfortunately, some definitions are based on little or selective archaeological information, like incomplete pottery assemblages from specific sites or layers, which are not readily comparable to others. Thus, although much information

concerning this time span accumulated in the last decades, discussions concerning its chrono-cultural definitions and their association with ^{14}C series are often simplistic. In fact, without detailed definitions of the periodic terms *Neolithic* and *Chalcolithic* (and their respective cultures; e.g., Gopher 2019), we will be left in the current limbo of circular arguments and unfounded cultural classifications. Thus, unless we produce a coherent and nuanced image of the cultural landscape and circumstances in the southern Levant during this time span, a comprehensive appreciation of this episode of the region's history will remain beyond our reach.

While the current state of this debate remains confusing and, in various ways, even frustrating (Gopher 2019), one seemingly fruitful way forward would be to create a detailed account of the relevant sites, strata, and assemblages. Such an account would begin with individual cases; these cases would be gathered into a comprehensive, nuanced, and accurate image capturing the full complexity of this time span in the southern Levant.

The current paper attempts to go beyond the abovementioned confusion and disagreements by accepting the tripartite division of the time span between ca. 6000/5800 BCE and ca. 3900/3800 BCE into the Early, Middle, and Late Chalcolithic periods (e.g., Garfinkel 1999) and focusing on the transition between the first two. To do so, we offer a detailed account of the earliest levels of Tel Tsaf, the type-site for the Middle Chalcolithic period. These strata were only casually explored in the late 1970s (Gophna and Sadeh 1988–1989). After a short introduction, we will provide a detailed report of these strata and their assemblages, which we will then use to explore how the early phases of the Middle Chalcolithic period compare to the south Levantine Early Chalcolithic period and hypothesize about the origin of the first community that settled at the site.

2. Tel Tsaf

Tel Tsaf is a large Middle Chalcolithic site in the Jordan Valley, near the town of Bet She'an (Fig. 1). It was first reported in the region's survey conducted during the 1940s and 1950s (Tzori 1958). It is one of several sites in the Jordan Valley, including Kataret es-Samra (Leonard 1985; 1989; 1992), Tell esh-Shunah North (Gustavson-Gaube 1986; Philip and Baird 1993; Baird and Philip 1994), Tell Abu Habil (de Contenson 1960; Leonard 1992), Tell Abu Hamid (Dollfus and Kafafi 1993: 246, Fig. 1:22; Lovell, Dollfus, and Kafafi 2007), and possibly Tell al-Mafjar (Anfinset et al. 2011: 103), that yielded late 6th–early 5th millennium remains (and see also de Contenson 1960; Garfinkel 1999: 186–188). Of these sites, Tel Tsaf is the most intensively and extensively studied and is, thus, the source of much of what we know about this period in the region.

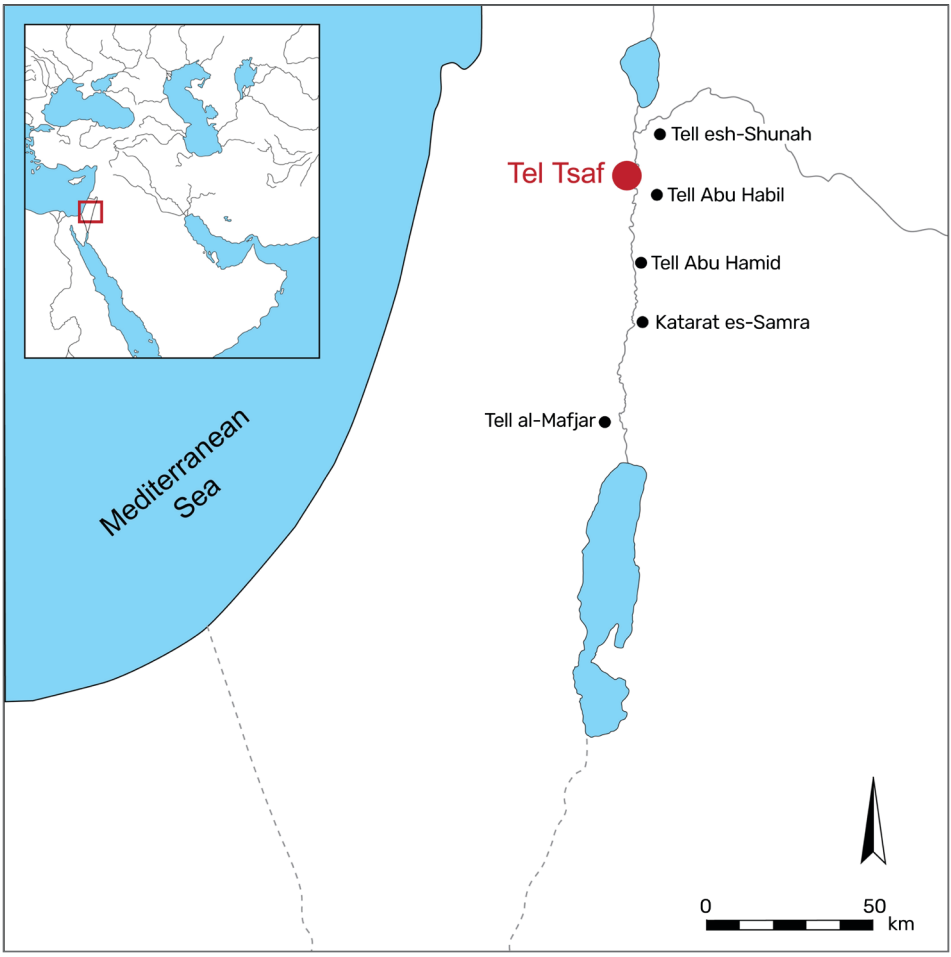

Fig. 1. The location of Tel Tsaf and other contemporaneous sites mentioned in the text.

Small-scale excavations at the site (ca. 100 m^2) were conducted in 1978–1980 by Gophna (Gophna and Sadeh 1988–1989). After a long pause, Garfinkel excavated approximately 800 m^2 of the site between 2004 and 2007 (Garfinkel, Ben-Shlomo, and Kuperman 2009; Garfinkel, Ben-Shlomo, and Freikman 2020; Freikman, Ben-Shlomo, and Garfinkel 2024) and surveyed of the area. Garfinkel's excavation consisted of four areas (Figs. 2, 3): Area A (excavated by Gophna), Area B (in the western part of the site, where a deep well was found), Area C (in the eastern part of the site), and Area D (a small probe northwest of Area C). Two main strata (Strata 3 and 4) were defined in Area C, the main excavation area, based on architectural features (Garfinkel, Ben-Shlomo, and Freikman 2020). They featured a densely built area with four large courtyard buildings comprising one or two rooms and a court with silos and cooking facilities.

Fig. 2. Tel Tsaf: (a) An aerial view of the site and its surroundings; (b) a view from the west.

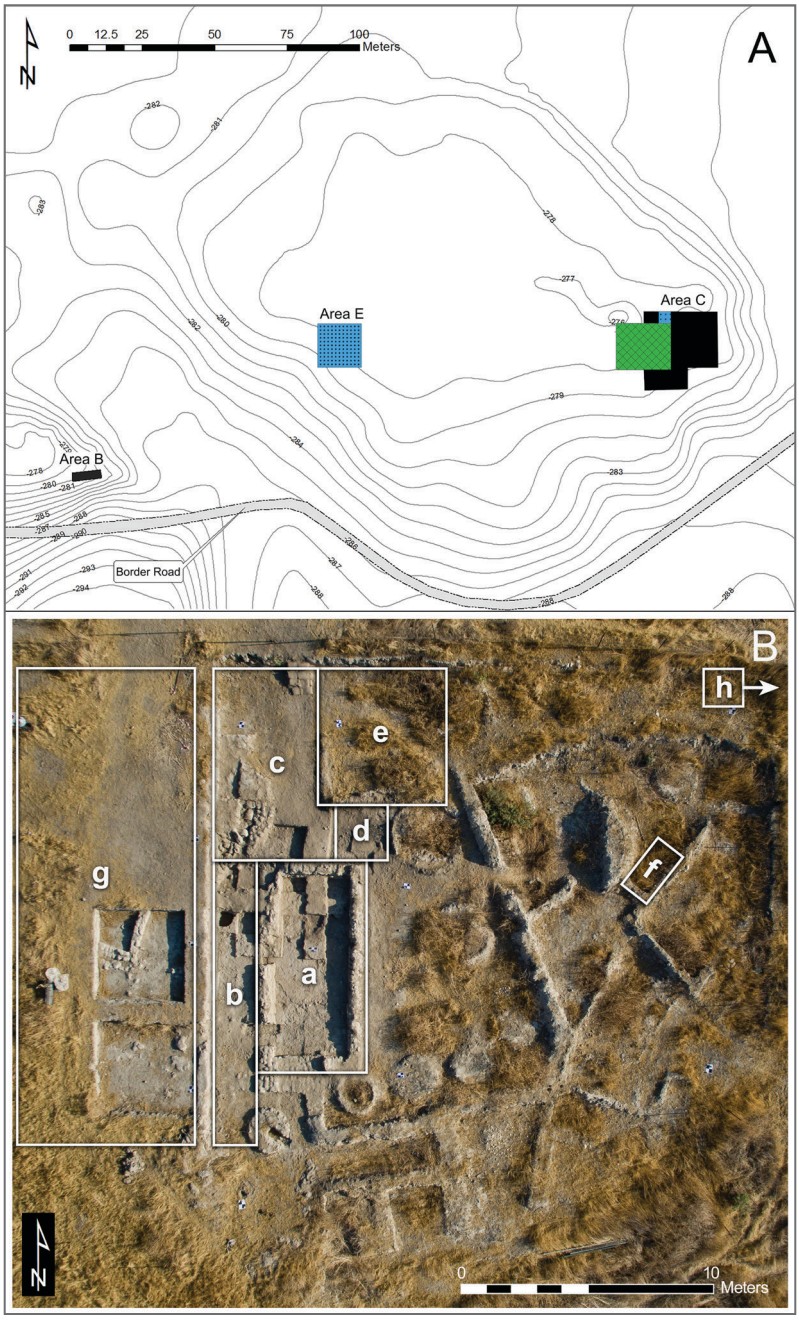

Fig. 3. The location of the main excavation areas at Tel Tsaf (top) and an aerial view of Area C indicating loci excavated during the renewed project (bottom): (a) Room C70; (b) the area west of Room C70; (c) the area north of Room C70; (d) a test trench between the northeastern corner of Room C70, Silo C339, and Room C337; (e) the deep cut in Sq. AR16; (f) the test probe near Installation C568 (Building Complex IV); (g) the new trenches west of Area C; and (h) the eastern section (east of the arrow).

We initiated the renewed and still ongoing project at Tel Tsaf in 2013. It uses high-resolution excavation and sampling methods to maximize data collection. A 1 × 1 m grid and 5 cm spits were employed, and sediments were sieved through a 2 mm mesh. Intensive floatation was conducted with a 250 μm net. The project's primary aim was to explore human-environment interactions and the establishment of the Mediterranean diet in the region (Rosenberg et al. 2014; 2020; 2021; 2023; Rosenberg, Garfinkel and Klimscha 2017; Rosenberg and Klimscha 2018; 2021; Chasan et al. 2021; 2022; Chasan, Spiteri, and Rosenberg 2022;). Area C also yielded five burials: two inside silos, two adjacent to these silos, and a baby burial with no apparent link to storage facilities (Garfinkel, Ben-Shlomo, and Kuperman 2009; Rosenberg et al. 2023). Much data was retrieved regarding food, diet, and culinary practices (e.g., Chasan et al. 2021; 2022a; Chasan, Spiteri, and Rosenberg 2022).

A wealth of finds was unearthed at the site, including some unique items, such as a copper awl (Garfinkel et al. 2014), and objects indicating short- and long-distance trade: obsidian, Ubaid pottery, beads made of various minerals, shells from the Nile River and the Mediterranean Sea, and non-local figurines and tokens (Garfinkel, Ben-Shlomo, and Kuperman 2009; Streit and Garfinkel 2015; Liu et al. 2022; Rosenberg and Klimscha 2021; 2020; 2022a; 2022b; 2022c; 2023; Hruby, Klimscha, and Rosenberg 2024). Published radiocarbon results date the site's upper levels to ca. 5200–4700 BCE (Rosenberg et al. 2014; Streit and Garfinkel 2015); however, recently procured dates (see below) stretch these levels' lower boundary to ca. 5300 BCE (Rosenberg et al. 2023), well within the transition between the Early to the Middle Chalcolithic periods (see Gopher 2019).

2.1. The lowest levels at Tel Tsaf

To reach the lowest levels in Area C, we focused on Sq. AR16 (20 m^2), which we began excavating at the level where Garfinkel's 2004–2007 expedition left off (Rosenberg et al. 2023). Excavations continued until the sterile Lisan formation was reached, ca. 2.5–3.0 m below the site's surface. Altogether, 14 strata were identified in this square below the ca. 80 cm excavated by Garfinkel; this paper focuses on the lowest two. The earliest occupation level, Stratum I, is represented by Pit C2311, which cuts into the Lisan marl. Thin accumulations directly above the Lisan sediments (Loci C2286, C2287, C2288, C2292, C2293, C2295, C2301, C2305, C2306, C2308, C2309, and C2310) were defined as Stratum II. The southern balk of Sq. AR16 intersected Pit C2311 (Fig. 4), which cut through the Lisan layers; its opening was identified at the very bottom of Locus C2305. The pit was circular, 2.25 m in diameter, and ca. 0.40 m deep with a flat bottom

(1.70 m in diameter) and steep sides. The fills in the pit comprised several accumulations of sandy, gray, and dark brown sediments intermixed with ash, charcoal, animal bones, artifacts, and a few pebbles. The sediments in Stratum II (0.43 m thick) were brighter and closer to the whitish Lisan bedrock; they also contained fewer finds. While the anthropogenic accumulations here lacked architectural elements, compact mudbrick material, mudbrick fragments, and charcoal were noted.

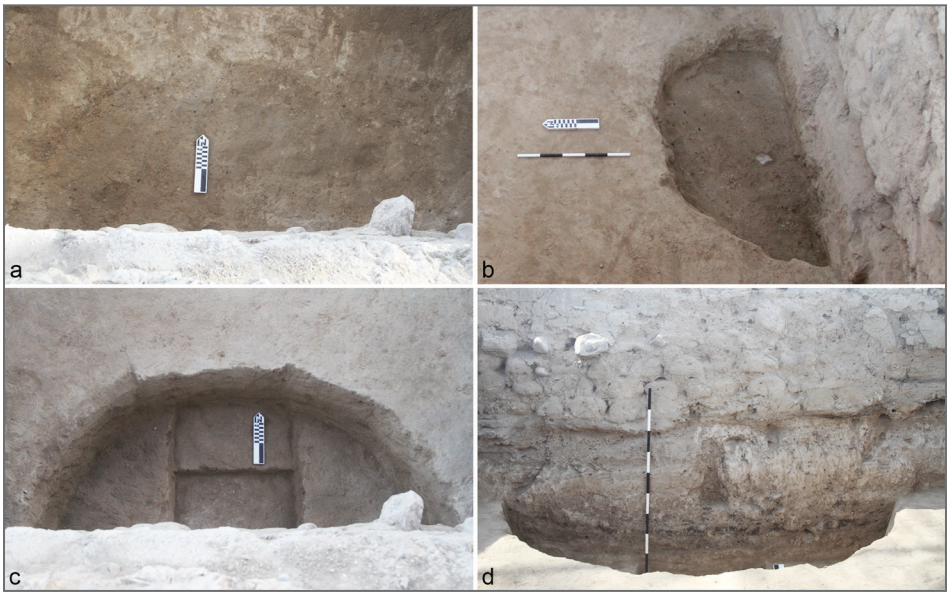

Fig. 4. Pit C2311 (Stratum I) dug into the Lisan sediments in the southern part of Sq. AR16. The areas north, east, and west of the pit are Lisan bedrock.

2.2. Dating the lowest levels at Tel Tsaf

Seven ^{14}C dates were obtained from Stratum II fills (five from charred olive pits and two from wheat grains) and two (wheat grains) from Stratum I (Table 1). Interestingly, Stratum II, which rests directly on the Lisan, produced a narrow range of dates spanning ca. 5210/5208 BCE and 5011/4940 BCE, while the samples from Pit C2311 (Stratum I) resulted in a wider range, from 5303/5304 BCE to 5066/5061 BCE, defining the earliest occupation at the site so far discovered.

Table 1. ^{14}C dates from Strata I and II.

Lab-ID	Locus	Stratum	Radiocarbon results		Calibrated year		Probability (%)	Sample taxonomy
			Date (yr BP)	±	From (BCE)	To (BCE)		
GrM-29404	C2301	II	6109	27	5208	4940	95.4	Olea europaea (stone)
GrM-29405	C2305	II	6112	27	5208	4942	95.4	Triticum sp. (seed)
GrM-26567	C2286	II	6145	29	5209	5001	95.4	Triticum sp. (seed)
GrM-29379	C2301	II	6138	27	5209	4996	95.4	Olea europaea (stone)
GrM-29381	C2301	II	6122	27	5209	4951	95.4	Olea europaea (stone)
GrM-29380	C2301	II	6128	27	5210	4958	95.4	Olea europaea (stone)
GrM-29382	C2301	II	6157	27	5210	5011	95.4	Olea europaea (stone)
GrM-29407	C2311	I	6228	28	5303	5061	95.4	Triticum sp. (seed)
GrM-29406	C2311	I	6234	27	5304	5066	95.4	Triticum sp. (seed)

2.3. Findings from Strata I and II at Tel Tsaf

2.3.1. The pottery

The pottery assemblage of Strata I and II in Sq. AR16 consists of 746 vessel sherds (Table 2). Most fragments are ca. 2–4 cm across and poorly preserved.

Table 2. The pottery assemblage from Strata I and II at Tel Tsaf.

Type	N	%
Rim	50	6.7
Handles	2	0.2
Bases	12	1.6
Varia (pedestal?)	1	0.1
Body sherds	681	91.4
Total	746	100

2.3.1.1. Technology

The assemblage is typically made of a medium-coarse paste, likely deriving from locally available clays rich in mineral temper (Goren 1991). The temper is visible to the naked eye (ca. 1–2 mm across) and includes limestone, chert, basalt, and, occasionally, ochre (Kościuk-Załupka et al. forthcoming). Grog and vegetal inclusions were also noted and are common in other strata as well (Shooval, Klimscha, and Rosenberg 2021). Most plain vessel surfaces are cream or light orange but can also be red and dark buff. Only a handful of coarse vessel sherds exhibit dark or gray cores, likely due to incomplete oxidation during firing (Rice 2015: 207).

2.3.1.2. Typology

Our typological terminology follows Hruby, Klimscha, and Rosenberg (2024) and builds on the typologies of Garfinkel (1999), Gopher and Eyal (2012a), and Shooval, Klimscha, and Rosenberg (2021). It primarily pertains to rim and upper-wall morphologies and is well-adjusted to the fragmented Tel Tsaf pottery repertoire (see also Freikman, Ben-Shlomo, and Garfinkel 2024). Due to fragmentation, only 43 sherds (5.8% of the early levels assemblage) were suitable for typological classification. They comprise 42 rim fragments and one unidentified sherd labeled *varia*. The rims were identified as bowls (n=29), holemouth jars (n=12), and an unidentified handled jar.

Bowls were further classified into subtypes according to wall and rim morphology as V-shaped, carinated, holemouth-like, and unidentified bowls. V-shaped and other open bowls (n=17; Fig. 5) with widely splayed, straight walls (Garfinkel 1999: Figs. 96, 99; Gopher and Eyal 2012a: Fig. 9.1:2–3; Hruby, Klimscha, and Rosenberg 2024: Fig. 3:1; 2024b: Fig. 6) are the most common vessel type in the assemblage. Their diameters at the rim range between 10 and 35 cm (avg. 19.8 cm). The rims of the bowls are tapered (n=14) or rounded (n=3) and 3.8–7.5 mm thick (avg. 5.1 mm; measured 0.5 cm below the vessel openings). Most bowls are orange- or red-slipped (n=6) or red-burnished (n=4) inside and out. A single sherd is black-slipped outside and red-slipped inside. Three sherds were classified as fine bowls resembling the so-called Dark-Faced Burnished Ware (DFBW; Kaplan 1969; Gopher and Gophna 1993: 328); they came from the same unit (L2287), and at least two likely belong to the same vessel (Fig. 5:3). A single bowl showed painted Tel Tsaf decoration (TTD; see below), and two others remained untreated.

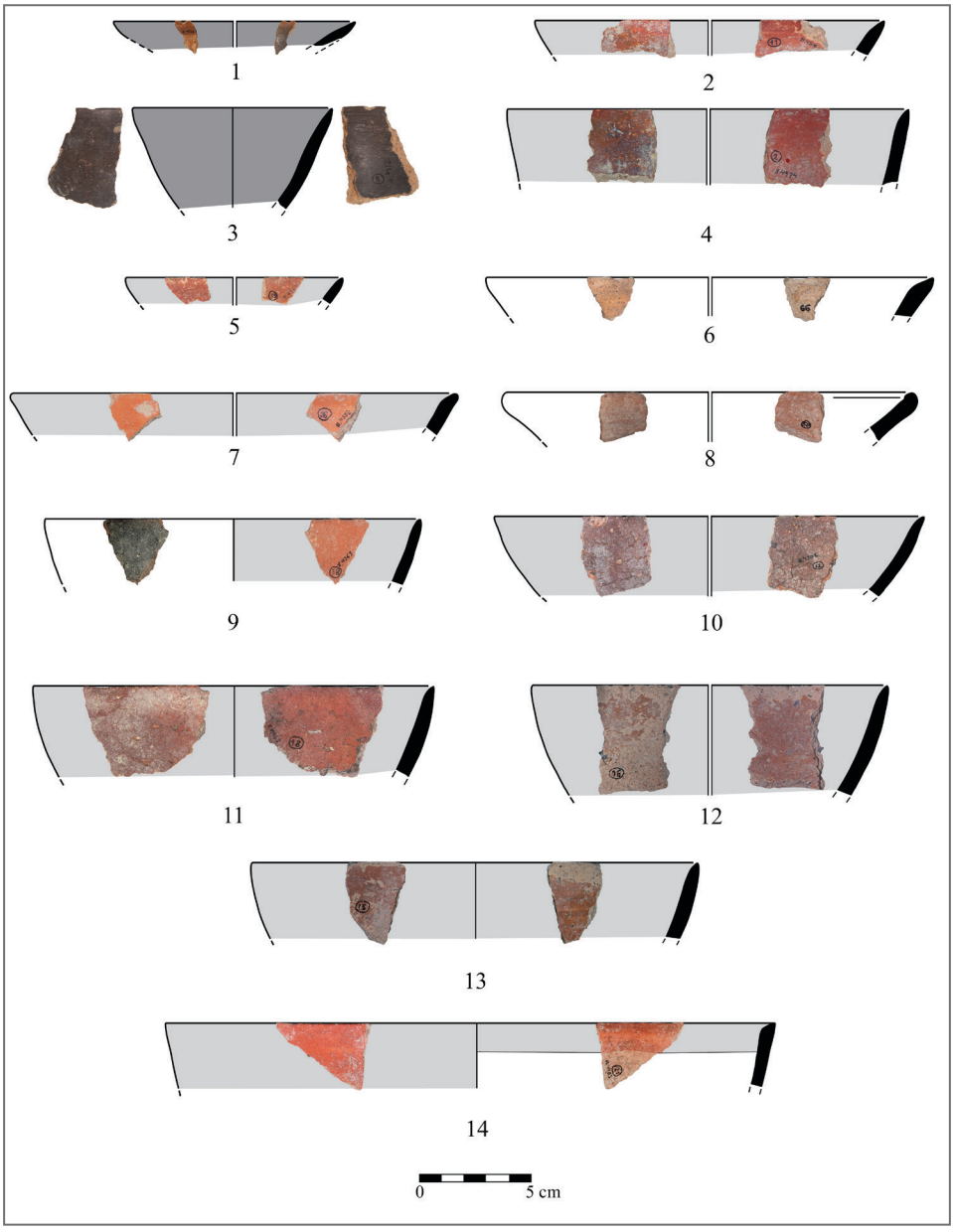

Fig. 5. Open bowls.

Carinated bowls (n=6; Figs. 6:1–2) have a concave carination below their everted rims (Garfinkel 1999: Figs. 94:9–12, 100:4–5; Getzov et al. 2009b: Figs. 2.23:2,5, 2.25:22; Gopher and Eyal 2012a: Fig. 9.1:8–9,11; Hruby, Klimscha, and Rosenberg 2024: Fig. 3:5,6; 2024b: Fig. 7:1,2). The bowl rims are tapered (n=4) or rounded (n=2) and between 3.3 mm and 6.5 mm thick (avg. 4.8

mm). All six bowls were red-slipped inside and out, and three showed traces of burnish. A single holemouth-like bowl has a sinuous profile, a globular body, and an everted rim (Garfinkel 1999: Fig. 94:1–5; Getzov et al. 2009b: Fig. 2.25:21; Hruby, Klimscha, and Rosenberg 2024: Fig. 3:7). It is 13 cm in diameter and has a tapered 5.0 mm-thick rim. The bowl was brown-slipped outside and red-slipped inside. The remaining five bowls could not be assigned to a specific subtype. Their rims are tapered (n=3) or rounded (n=2) and are 4.2–15.8 mm thick (avg. 7.4 mm). Two bowl rims bear red or black slips, and three are untreated.

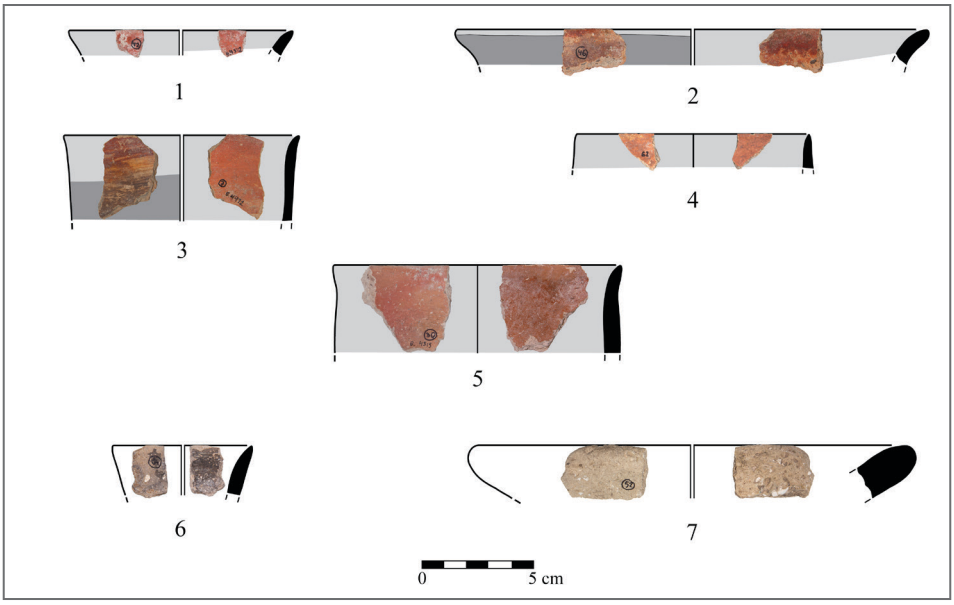

Fig. 6. Various bowls.

Jars include primarily holemouth jars, which are further subdivided into simple-rim and raised-rim holemouth jars. Simple-rim holemouth jars (n=9; Figs. 7:1–5) have straight or incurving rims that continue the upper walls (Garfinkel 1999: Fig. 104:4–7; Getzov et al. 2009b: Figs. 2.23:20–23, 2.29:22, 2.31:4; Gopher and Eyal 2012a: Fig. 9.1:31,32,37,38; Hruby, Klimscha, and Rosenberg 2024: Fig. 3:9,10; 2024b: Fig. 8:1–5). Rim diameters range from 8 to 20 cm (avg. 12.8 cm). The rims are usually rounded (n=8) or tapered (n=1) and 3.6–8.4 mm thick (avg. 6.8 mm). They are red (n=3), brown (n=1), or black and red slipped (n=1). Two fragments are painted: one with dots on the exterior and another with TTD on the interior rim (see below).

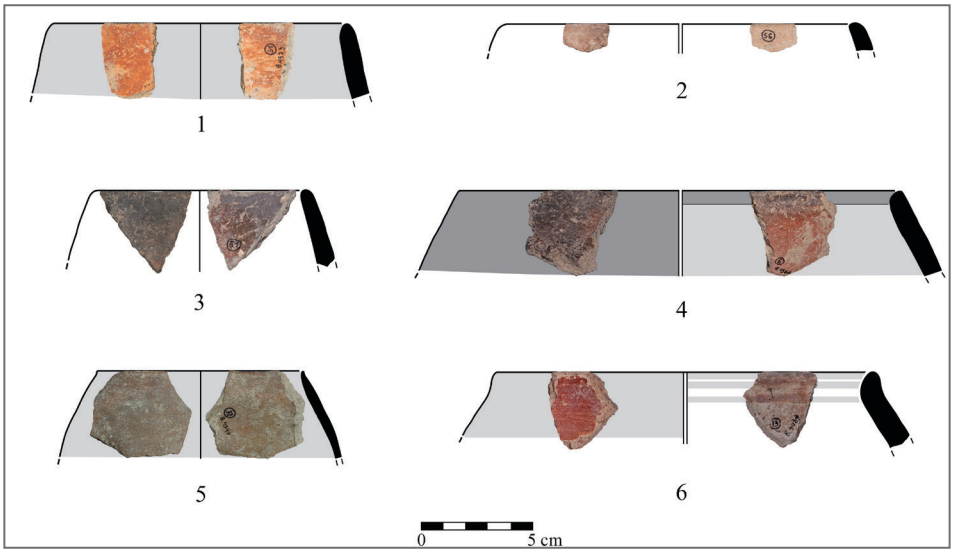

Fig. 7. Holemouth jars: simple-rim (1–5), raised-rim (6).

Raised-rim holemouth jars (n=3; Fig. 7:6) have everted rims, vertically raising from the vessels' globular bodies (Garfinkel 1999: Fig. 106; Getzov et al. 2009b: Fig. 2.29:24–26; Hruby, Klimscha, and Rosenberg 2024: Fig. 3:11,12; 2024b: Fig. 8:9–12). The vessels' rim diameters are indeterminate, but their rims are flattened (n=2) or rounded (n=1) and 9.0–9.3 mm thick (avg. 9.2 mm). One sherd is red-slipped, one is red-burnished, and one has no visible surface treatment. The unidentified handled jar has a rounded 9 mm-thick rim. A small protrusion ca. 2 cm below the rim indicates the jar's handle. No carination was noted, suggesting it was a holemouth jar with handles or a necked jar with handles placed over the unpreserved neck-to-shoulder transition. The exterior surface bears some remains of orange slip.

A single small sherd labeled *varia* is possibly a fragment of a fenestrated pedestal's ring base and leg joint. It is 7.2 mm thick and red-slipped.

Except for the handled jar described above, only two sherds were identified as handle fragments. Unfortunately, their morphology and sizes remain unclear since they were broken off. Vessel bases (n=12) are concave with a slightly raised center on the exterior bottom (n=6; Fig. 8:1,2; e.g., Garfinkel 1999: 184; Gopher and Eyal 2012a: Fig. 9.1:60; Hruby et al. 2024: Fig. 11:3–6), flat (n=3; Fig. 8:3) or disc (n=1; Fig. 8:4; Hruby et al. 2024: Fig. 11:7–9). Two specimens were poorly preserved and could not be assigned to a type. The bases' thickness is 0.3–1.6 cm (avg. 0.9 cm), and their diameters are 4.0–10.0 cm (avg. 7.2 cm). Most are red-slipped (n=10) either inside and out (n=6) or only outside (n=4). No surface treatment was applied to the remaining two items.

Table 3. Types and colors of surface treatment on pottery vessels' inner and outer faces, Strata I and II at Tel Tsaf.

EXTERIOR \ INTERIOR		Slipped					Slipped and burnished				Decorated	Plain	Total	%
		Orange	Red	Brown	Gray	Black	Red	Brown	Black	DFBW	TTD*			
Slipped	Orange	8			1							6	**15**	**2.0**
	Red		239	9	12	2						185	**447**	**59.9**
	Brown		27	10	4	3						41	**85**	**11.4**
	Gray	1			6							2	**9**	**1.2**
	Black		8	2		1						15	**26**	**3.5**
Slipped and burnished	Red		1				13	1				3	**18**	**2.4**
	Brown						1	1	1			2	**5**	**0.7**
	Black								2			2	**4**	**0.5**
	DFBW									6			**6**	**0.8**
Painted	Red											2	**2**	**0.3**
	Brown			1								1	**2**	**0.3**
Decorated	TTD*		2	1									**3**	**0.4**
	TTD* and red slip		1									1	**2**	**0.3**
	Painted non-TTD											1	**1**	**0.1**
	RD** and Red Slipped		2									3	**5**	**0.7**
	RD and Brown Slipped											1	**1**	**0.1**
	RD and red-burnished						1						**1**	**0.1**
	Incised											2	**2**	**0.3**
Plain			6	3	1	1			2		1		**14**	**1.9**
Total		**9**	**286**	**26**	**24**	**7**	**15**	**2**	**5**	**6**	**1**	**267**	**648**	**86.9**
%		**1.2**	**38.3**	**3.5**	**3.2**	**0.9**	**2.0**	**0.3**	**0.7**	**0.8**	**0.1**	**35.8**	**86.9**	

* Tel Tsaf decoration

** Rope decoration

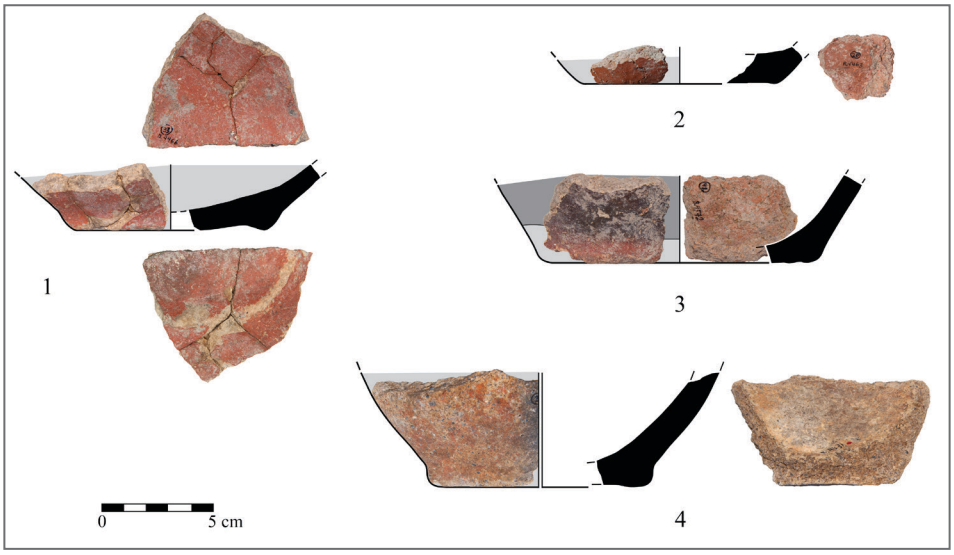

Fig. 8. Vessel bases.

2.3.1.3. Surface treatment and decoration

Most sherds (n=648, 86.9% of the assemblage) were subjected to pre-firing surface treatment (Table 3), a pattern also characteristic of the site's upper layers (e.g., Freikman, Ben-Shlomo, and Garfinkel 2024; Gophna and Sadeh 1988–1989; Shooval, Klimscha, and Rosenberg 2021). Slip over the vessel's exterior and interior or only the exterior is the prevalent surface treatment (n=594, 79.6%). The slip is usually red but occasionally brown, orange, gray, or black. Most slips are of one color (n=525, 70.4%), but sometimes exteriors and interiors feature different colors (usually brown-slipped exteriors and red-slipped interiors; n=27, 3.6%).

There is little evidence of burnishing (n=35, 4.7%). Burnish occurs mainly on red-slipped sherds (n=17, 2.3%), while the remaining sherds tend to be brown or black. Among these, six (0.8% of the assemblage) are DFBW vessels. Plain burnish was not found in the current assemblage. Paint was distinguished based on visible traces of red and brown brushstrokes; such instances are rare (n=45, 0.67%), mainly occurring on vessels' exterior surfaces.

Only 16 pottery sherds are decorated with geometric patterns executed in different techniques (2.1% of the assemblage): seven are painted (0.9%, including one with two red dots and six with TTD; see Hruby, Klimscha, and Rosenberg 2024; forthcoming), seven are plastic (i.e., rope decoration; 0.9%), and two are incised (n=2, 0.3%). TTD and rope decorations were usually accompanied by red or brown slip and, in one instance, burnishing. The two incised examples were executed on plain sherds.

Most TTD examples (Fig. 9:1–6) include geometric motifs (see Hruby, Klimscha, and Rosenberg 2024). Two bear a band filled with cross-hatching (Fig. 9:1,2), and one bears a double band filled with rows of solid and cross-hatched diamonds (Fig. 9:3). A somewhat unique find is a sherd of a holemouth jar (see below) bearing a vertical herringbone/zigzag pattern on its rim's interior (Fig. 9:4). Two sherds preserve the edges of a band decoration but not the geometric pattern used to fill it (Fig. 9:5,6). Painting (black, brown, or dark red) was executed with a thin brush directly on the untreated light orange vessel surface.

A single example of the non-TTD painted decoration shows red dots (two preserved), ca. 0.8 cm in diameter (Fig. 9:7). They were placed one below the other on the untreated exterior surface of a holemouth jar, close to its rim. Rope decoration was identified in six cases on the exterior surfaces of body sherds (Fig. 9:8–11). All examples were plastic additions with impressions: Five are thumb-impressed, and one is too damaged to say. In all six cases, the decorated surfaces were also red- or brown-slipped, and one sherd was burnished, too. The incised decoration was identified in two cases on plain sherds; they are poorly preserved, and the pattern cannot be determined.

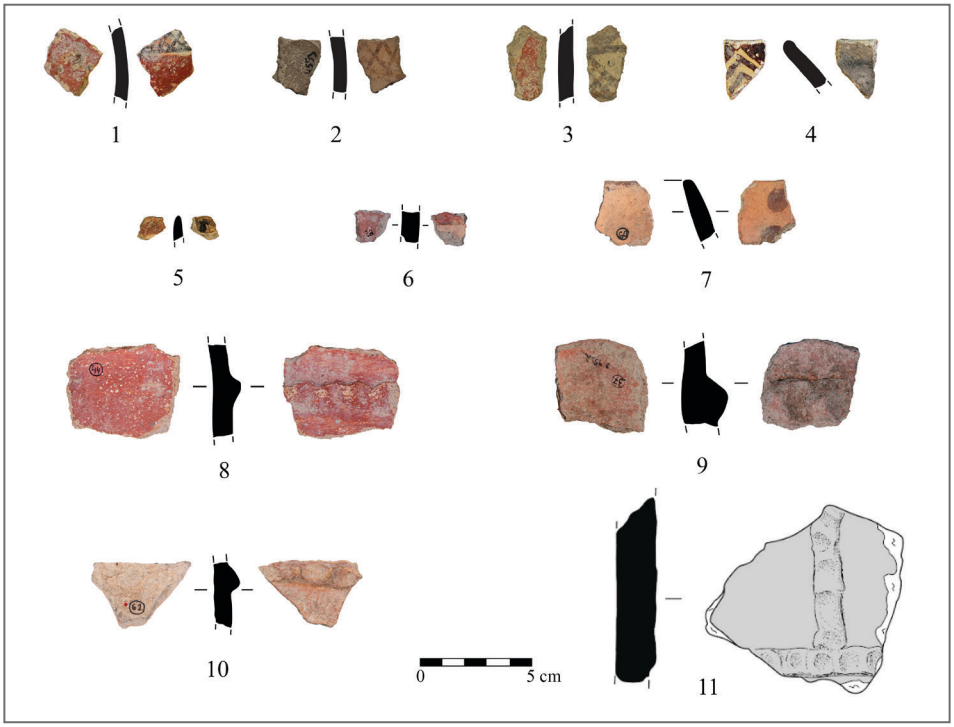

Fig. 9. A selection of decorated sherds from the earliest layer: Tel Tsaf decoration (1–6), red-painted dots (7), thumb-impressed rope decoration (8–11).

2.3.2. The flint assemblage

So far, only data pertaining to the flint assemblage of the later strata of Tel Tsaf is available (Dag and Garfinkel 2007; Gopher 1988–1989). The lithic assemblage from Strata I and II in Sq. AR16 comprises 389 items (Table 4, Fig. 10), 208 of which are debitage and tools. The raw material sources are yet to be determined. However, the character of the cortical cover on blanks and tools (n=50) provides some insights (e.g., Fernandes, Raynal, and Moncel 2008; Shimelmitz, Kuhn, and Weinstein-Evron 2020). Only half of the assemblage features a calcareous cortex typical of primary geological sources, while the remainder feature patinated (10%) and rolled (40%) neocortex typical of secondary geological sources, probably deriving from riverbed further east or west of the site.

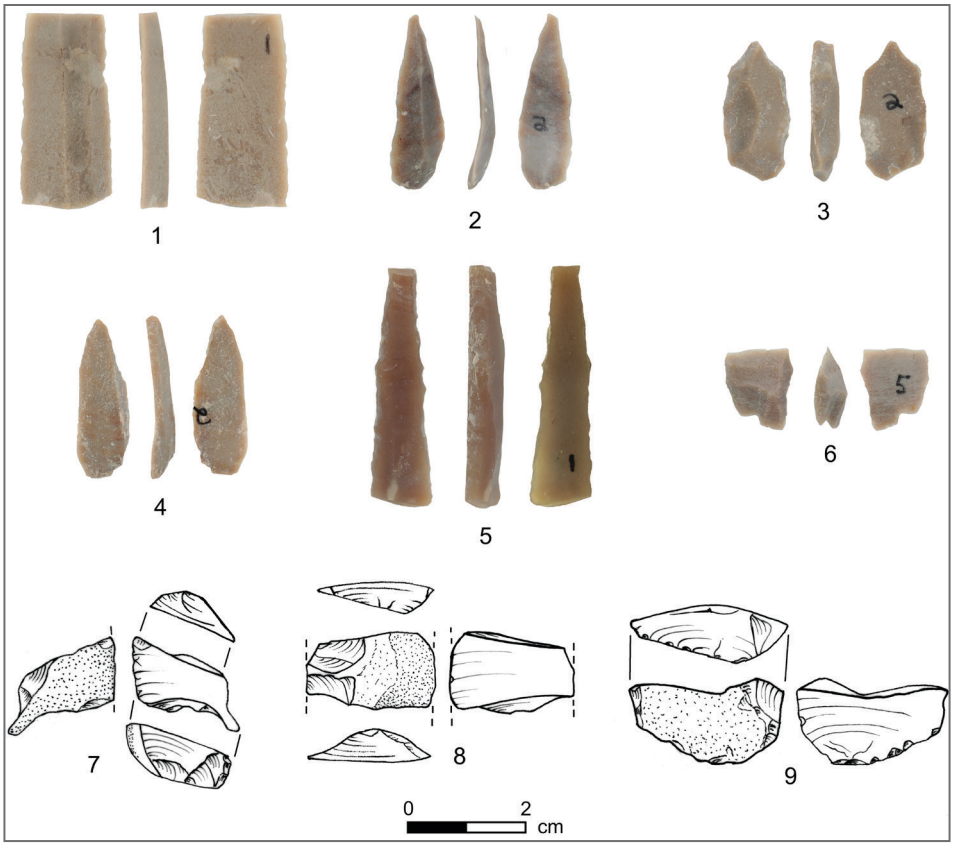

Fig. 10. Flint items from the early loci at Tel Tsaf: a blade (1), borers (2–4), a drill (5), a transversal arrowhead (6), retouched side-blow-blank flakes (7–9).

Table 4. The lithic assemblage from Strata I and II at Tel Tsaf.

	Whole	Proximal	Medial	Distal	Total	% of debitage and tools	% of assemblage
Primary element flake	8	3	2	4	17	8.2	4.4
Primary element blade	1		2	1	4	1.9	1.0
Flake	46	18	13	22	99	47.6	25.4
Blade	2	4	10	4	20	9.6	5.1
Bladelet	4	5	3	2	14	6.7	3.6
Core trimming element	6	2		1	9	4.3	2.3
Burin spall	1			3	4	1.9	1.0
Side-blow-blank flake		3	2	3	8	3.8	2.1
Core					4	1.9	1.0
Core fragment					2	1.0	0.5
Tool	10	6	5	6	27	13.0	6.9
Total debitage and tools	75	40	28	38	208	100	
Chunk					58		14.9
Chips*					122		31.4
Hammerstone	1				1		
Total					**389**		**100**

* The chips include six bladelet fragments.

Flakes are the primary blank type, accounting for almost half of the material in the assemblage (47.6% of debitage and tools), probably echoing the expedient production that flourished in late Holocene assemblages (Barkai and Gopher 1999; Shimelmitz 2022). The flakes are usually small, measuring, on average, 24.8 mm long (sd 9.8), 19.9 mm wide (sd 7.6), and 5.3 mm thick (sd 2.3). Blades and bladelets are also found in the assemblage, albeit in relatively small numbers. Nonetheless, they suggest three reduction sequences: (1) the production of bladelets, (2) the production of "simple" blades, and (3) the production of blades using indirect percussion. The latter comprises only a few items; they have uniform parallel edges and ridges and are evenly thick across their length (Fig. 10:1). Among the bladelets, translucent raw material is rare. The four cores are small and mainly indicate bladelet production, where a joint reduction of flakes and bladelets was probably geared to maintain the needed convexities.

Nine side-blow-blank flakes were found in the assemblage, eight among the debitage and one among the tools. They are usually considered a technology for the controlled splitting of blades (Nishiaki 1996; 2000; Vardi and Gilead 2011). In our assemblage, it was used to split various blanks, including primary element flakes (n=2), primary element blades (n=1), flakes (n=5), and blades (n=1). Notably, three items are slightly retouched (Fig. 10:7–9).

The tools (n=27) include five scrapers, one retouched flake, two denticulates, three borers (Fig. 10:2–4), one drill (Fig 10:5), two burins, one retouched blade, five microliths, one sickle blade, one transversal arrowhead (Fig. 10:6), one item classified as *varia*, and four unidentified tool fragments. The sickle blade is represented by a small fragment, rendering comparison with the sickle blades from the upper part of the site (Groman-Yaroslavski et al. 2024) and other Pottery Neolithic and Chalcolithic sites (Vardi 2012) currently futile. The microliths usually have partly retouched edges. The varia tool is a primary element flake steeply retouched on both edges, bearing a split scar typical of the side-blow-blank flake (Fig. 10:7).

2.3.3. The ground stone tools and bead assemblages

The ground stone assemblage of Strata I and II in Sq. AR16 is small. A few items (n=8) were found, mainly in Stratum II. None of the tools is indicative of period or culture. The assemblage includes a small (21 cm long; 2.5 kg) oval lower polishing tool (pallet) made of compact, siliceous limestone (Fig. 11:1), which was flaked to shape. The polishing surface is slightly concave and bears pecking marks and striations. Also present are a small oval limestone burnisher (Fig. 11:2) polished all over; a small highly smoothed body fragment of a basalt vessel (Fig. 11:3); a small sandstone fragment (Fig. 11:4) that was likely part of a larger polishing tool; and a small limestone pebble that was used as a small pallet (Fig. 11:5). This pebble is smooth, oval, and concave-convex in cross-section (9.2 cm long, 5.1 cm wide, and 2.41 cm thick; 90 gr). Additional items include a small (234 gr) abraded oval limestone pebble used as a burnisher (Fig. 11:6) and a small (395 gr) amorphous limestone pebble that was likely used as an abrader or crusher (Fig. 11:7).

A limestone spindle whorl was also recovered (Fig. 11:8). It is round-oval and plano-convex in cross-section. It is 3.8 cm across, 0.9 cm thick, and 16 gr in weight. The aperture is 0.6 cm in diameter and slightly off-center.

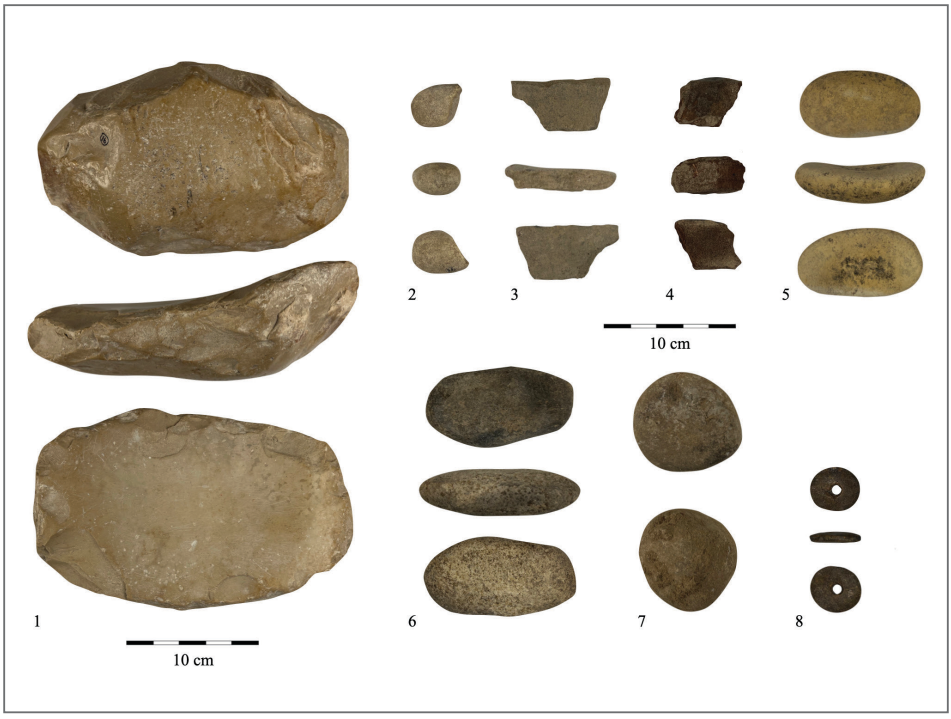

Fig. 11. The ground stone assemblage from the early loci at Tel Tsaf: limestone pallet (1), limestone burnisher (2), basalt vessel fragment (3), unidentified sandstone tool fragment (4), limestone "pallet" (5), limestone burnisher (6), limestone abrader/crusher (7), limestone spindle whorl (8).

Two beads were found in Strata I and II. One is a disc bead, 6.8 mm in diameter and 3.4 mm thick; its apertures measure 2.9 and 2.6 mm in diameter. This bead seems to have been made of a whitish clay mixture (several beads made of a similar substance were found in the site's later strata). The other bead is cylindrical and made of gray stone. It is 10.4 mm long and 9.1 mm in diameter, and its apertures are 4.1 mm in diameter. Additionally, a small fragment of a green fluorapatite chunk was found. Similar finds were recovered in the later strata; they were used to produce beads and other artifacts.

2.3.4. The faunal assemblage

The study of the faunal remains of Strata I and II in Sq. AR16 sought to understand human-animal interactions in the earliest phases of the site, including animal hunting, herding, carcass processing, and use. Identifications were made using the University of Haifa Zooarchaeology Laboratory comparative collection, online anatomical collections, and published guides (Schmidt 1972; Cohen and Serjeantson 1996; Hillson 1996; Zeder and Lapham 2010). Taphonomic data

were collected from identified and unidentified specimens, including the degree of burning and the number of cut marks (Stiner et al. 1995; Abe et al. 2002). Species abundance analysis was based on the number of identified specimens (NISP).

A total of 151 specimens were identified to the level of the skeletal element portion and animal species or body-size category (following Stiner 2004). Identifiability varied across loci (Table 5) and initially appeared low overall (13%). However, these samples included material recovered through a thorough floatation screening protocol, which produced small and highly fragmented elements. Additionally, the humid, hot conditions during excavation and encrustations on bone surfaces caused high bone and tooth fragmentation after only brief periods of exposure. Notwithstanding, faunal preservation was relatively good.

Most loci yielded burned animal remains, indicating that human activities with fire altered the site's refuse (Table 5). Several faunal carbonized (burned black) or calcined (burned white) remains were detected; they were exposed to low or high degrees of heat (following Stiner et al. 1995). Sometimes, burned remains were found in higher concentrations, including instances of direct exposure to high heat. Other loci yielded some carbonized remains that were indirectly exposed to heat. Only two specimens with cut marks were detected. This small number is likely due to concretions obscuring the surface of many ungulate remains. The average fragment size appeared somewhat small across the loci, likely reflecting a moderately high level of fragmentation overall.

Table 5. The number of identified (NISP) and unidentified faunal specimens, the number of burned specimens (black = low heat, white = high heat), and the average maximum lengths of identified specimens per locus from Strata I and II at Tel Tsaf.

Locus	NISP	Unidentified	Burned black	Burned white	Burned total	Average max. length of identified specimens (mm)
2286	54	358	7	1	8	24.4
2287	19	161	6		6	35.6
2288	nd	nd				n/a
2292	9	98	1		1	30.7
2293	5	36		3	3	29.2
2295	1	3				60
2301	33	145	9	7	16	20.9
2305	19	113	4	10	14	18.9
2306	5	8				11.4
2308	0	1				n/a
2309	0	2		1	1	n/a
2310	nd	nd				n/a
2311	7	77	4	1	5	19.5
Total	**151**	**1002**	**31**	**23**	**54**	**24.5**

Remains of wild and domesticated ungulates dominate the assemblage (78%; Table 6). Of the ungulates, caprines (19% of total NISP) and pigs (24.5% of total NISP) were the most abundantly represented. The nine medium-sized ungulate remains probably belong to these taxa. Fewer remains of wild gazelle specimens were securely identified (5% of total NISP). Still, specimens only identifiable to the small-bodied ungulate category (n=29) may also be of this taxon. Remains of cattle were rare (< 2% NISP). Carnivores and other small animal remains were present in low numbers (9% of total NISP). Of the carnivores, fox remains were most common (n=9), and one specimen might be a mustelid. Few remains of very small animals were identified (3% of total NISP), including a mole rat (*Spalax sp.*) and a vole (*Arvicola sp.*). Fish are represented in the assemblage, although their low numbers are surprising given the site's proximity to the Jordan River.

A closer examination observes that the species frequencies at early Tel Tsaf differ from those of the site's later phases (Table 7). In the site's early assemblage, the cattle frequency is lower than in the late assemblages, but caprines are abundant in both (Hill 2011).

The sample size of the identified species is too small for statistically significant comparisons. However, a rough comparison shows that the abundances of major domesticates at

Table 6. Species abundance in Strata I and II at Tel Tsaf (Indt. = Indeterminate).

Species and taxa categories	NISP
Ungulates	**118**
Cattle (Bos sp.)	**2**
Pig/boar (Sus scrofa)	**37**
Caprine group total	**30**
-Goat (Capra sp.)	5
-Possible goat	2
-Sheep/goat	21
-Sheep (Ovis sp.)	1
-Possible sheep	1
Gazelle (Gazella sp.)	7
Small ungulate (gazelle, roe deer-sized)	**29**
Medium ungulate (pig, caprine-sized)	**9**
Medium-small ungulate	**4**
Carnivores	**14**
Carnivore Indt.	**2**
Red fox (Vulpes vulpes)	**9**
Small carnivore Indt.	**2**
Mustelidae	**1**
Other small animals	**14**
Tortoise (Testudo graeca)	**1**
Hare (Lepus sp.)	**2**
Small mammal (hare-sized)	**4**
Tiny bird	**2**
Medium bird (partridge-sized)	**2**
Fish, sea bream (*Sparus sp.*)	**1**
Fish, mullet or perch	**1**
Crab	**1**
Very small mammals	**5**
Tiny rodent	**1**
Medium rodent	**1**
Large rodent	**1**
Mole rat (possible *Spalax sp.*)	**1**
Vole (*Arvicola sp.*)	**1**
Total	**151**

Table 7. Taxonomic group NISP values for assemblages from Tel Tsaf and other Early Chalcolithic Wadi Rabah assemblages.

Comparative sites	Caprine	Gazelle	Cattle	Pig	Other ungulates	Small game*	Total NISP	Source
Tel Tsaf, early	*30*	*7*	*2*	*37*	*0*	*33*	*151*	*This study*
Abu Zureiq	39	4	71	32	0	1	147	Horwitz 2002
Nahal Betzet II	11	0	5	9	0	0	25	Getzov et al. 2009a
Newe Yam	156	17	169	123	0	26	491	Horwitz, Galili and Lernau 2006
Tel Dover	117	0	6	28	0	present	151	Khalaily et al. 2016
Nahal Zehora II, St. II**	222.5	37.1	64.9	125.1	0	9.3	463.5	Davis 2012
Nahal Zehora II, St. I**	32.7	12.9	9.9	19.8	0	0.8	76	Davis 2012
Nahal Zehora I**	37.3	0	16.3	31.5	2.3	15.1	116.5	Davis 2012
Tel Dan	20	0	32	9	1	1	63	Horwitz 2002
Tel Ro'im West	291	14	154	176	6	29	1120	Agha, Nadel and Bar-Oz 2019
En Zippori	17	0	9	11	0	0	89	Barzilai et al. 2013
Yiftah'el	134	367	52	82	4	67	858	Namdar et al. 2021
Tel Tsaf, late	5642	338	1924	4408	10	401	14380	Hill 2011

* Broad grouping of all animals smaller than ungulates; large carnivores (*i.e., P. leo*) are excluded.

**Calculation based on published %NISP values and total NISPs in Davis (2012).

early Tel Tsaf differ slightly from those of other Wadi Rabah sites in the southern Levant, mainly by token of a higher ratio of pig remains (Fig. 12). The domesticated fauna of early Tel Tsaf differs from sites with more cattle, especially Newe Yam, Tel Dan, and Abu Zureiq (Horwitz 1987; 2002; Horwitz, Galili and Lernau 2006). Early Tel Tsaf also differs from most Wadi Rabah sites, as they feature higher proportions of caprine remains, particularly Yiftah'el, Tel Dover and Nahal Zehora II (Strata I and II, see Davis 2012; Khalaily et al. 2016). Somewhat more even abundances of caprine and pig remains were detected at En Zippori, Nahal Betzet II (Layer 2a), Nahal Zehora I, Tel Ro'im West (Strata II–III) (see Getzov et al. 2009a; Barzilai et al. 2013; Agha, Nadel, and Bar-Oz 2019). These proportions are more similar to those detected for the later assemblages of Tel Tsaf (Hill 2011).

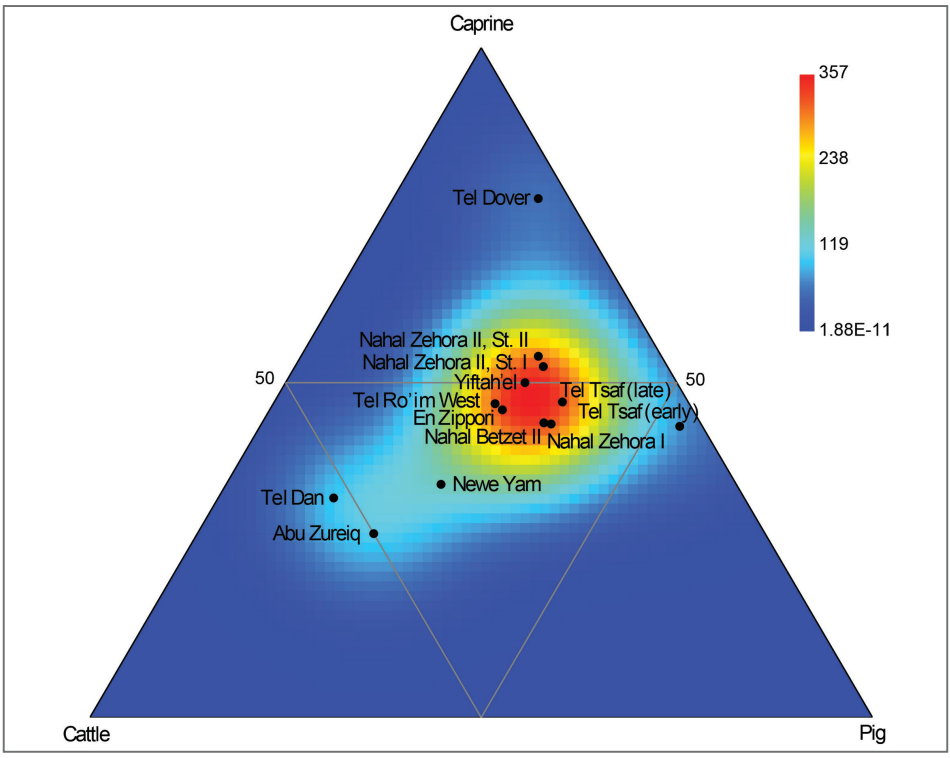

Fig. 12. Triplot density of major ungulates remains from early Tel Tsaf and other Early Chalcolithic sites in the southern Levant.

An exploratory comparison of the caprine-to-gazelle ratios reflects a definitive preference for domesticated over wild ungulates. The ratio at early Tel Tsaf is most similar to the broadly contemporaneous assemblages from Early Chalcolithic Nahal Zehora II (Strata I and II), Abu Zureiq, and Newe Yam (Fig. 13). At Tel Tsaf, an increase in the ratio of caprine to gazelle is observed over time. The Tel Tsaf assemblages are unlike many Wadi Raba-culture, Early Chalcolithic assemblages like 'En Zippori, Tel Dan, Tel Dover, Nahal Betzet II, and Nahal Zehora I that lack gazelle remains altogether. Still, the proportion of gazelle remains at early Tel Tsaf, and the Wadi Rabah assemblages mentioned here were relatively low compared to the Early Chalcolithic assemblage from Yiftah'el (43% gazelle; Namdar et al. 2021).

One of the unique aspects of early Tel Tsaf was the abundance of small game animals (20% NISP), which occur in frequencies higher than those detected in the site's later phases and other contemporaneous south Levantine assemblages (Table 7). The next highest levels were sighted in Nahal Zehora I (11.2%) and Newe Yam (5.3%). These discrepancies are likely due to different recovery methods and how faunal assemblages were subdivided for specialized micro-faunal analysis.

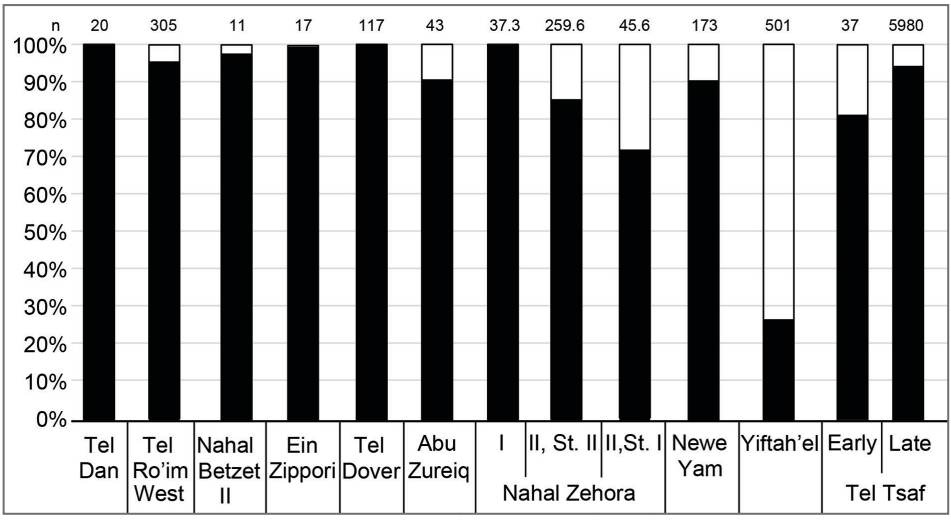

Fig. 13. Relative frequencies of caprine (black) and gazelle (white) remains in Early and Middle Chalcolithic sites in the southern Levant.

A preliminary exploration of body-part representation detected some similarities across different taxa (Table 8). Teeth were more common throughout. For several taxa, the relatively durable remains of phalanges, carpals, and tarsals were more abundant than other body parts. Pigs, however, are represented by all body parts. Considering the assemblage's high level of fragmentation, it is likely that density-mediated attrition impacted its structure. Still, some taxa were represented by a broad range of body parts.

Table 8. Body-part frequencies of major taxa recovered from Strata I and II at Tel Tsaf.

	Cattle		Pig		Caprine		Gazelle		Carnivore	
Anatomical Unit	**NISP**	**%NISP**	**NISP**	**%NISP**	**NISP**	**%NISP**	**NISP**	**%NISP**	**NISP**	**%NISP**
Teeth	2	100	18	48.6	16	53.3	4	57.1	6	46.1
Head			4	10.8					5	38.4
Axial			1	2.7						
Upper Forelimb			2	5.4						
Lower Forelimb			3	8.1	4	13.3				
Upper Hindlimb			1	2.7						
Lower Hindlimb			2	5.4	1	3.3				
Feet, Carpals & Tarsals			6	16.2	9	30.0	3	42.9	2	15.3
Grand Total	**2**	**100**	**37**	**100**	**30**	**100**	**7**	**100**	**13**	**100**

A small collection of shells was found in the early layers. All are local freshwater species, such as the *Theodoxus jordani*, which were used for beads in the upper layers of occupations at the site (Rosenberg et al. 2022b).

2.3.5. The worked bone assemblage

Six worked bones were retrieved from Strata I and II in Sq. AR16 (Fig. 14; Table 9). They include three fragments of flat abraded bone (Table 9:1,3,6), two of which are likely of spatula-shaped tools (Table 9:3,6), a fragment of a bone pin (Table 9:2), a fragment of a smooth polished bone (Table 9:4; not pictured), and a long bone fragment with a pointed end (Table 9:5); the latter was broken lengthwise along the shaft where it was possibly drilled. The worked bone artifact assemblage reflects diverse uses of bone. Spatulas and pointed tools may have been used in various local tasks, including ceramic production and hide or fiber processing (e.g., LeMoine 2010).

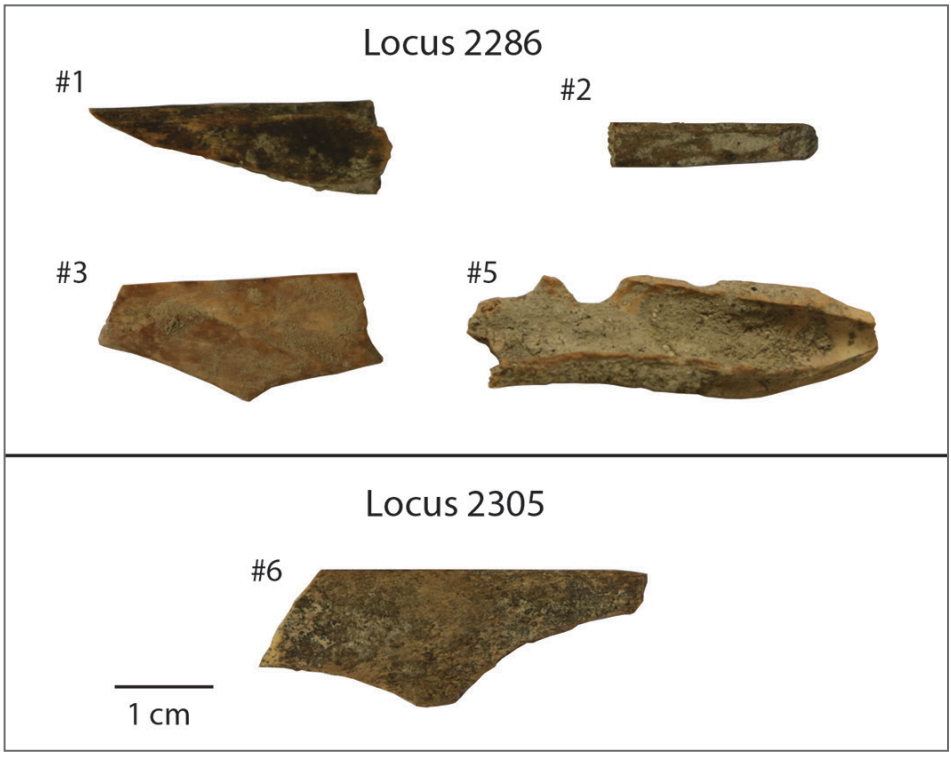

Fig. 14. Worked bones recovered from the early loci at Tel Tsaf (numbers according to Table 9).

Table 9. Summary of worked bone artifacts from Strata I and II at Tel Tsaf.

#	Locus	Shape	Abraded	Drilled	Polished
1	2286	Flat	x		x
2	2286	Pin/awl			
3	2286	Flat spatula	x		
4	2286	N/A (too fragmented)			x
5	2286	Pointed		x	
6	2305	Flat spatula	x		

2.3.6. The botanic assemblage

The botanic assemblage from Strata I and II in Sq. AR16 is currently being analyzed. Hence, we provide only preliminary results here. Altogether, 501 carbonized plant remains were retrieved and identified from the 31 flotation samples encompassing seven loci. The assemblage consists of nine edible plant species, including cereals, fruits, and pulses, all part of the Mediterranean diet. Flax (*Linum usitatissimum*), a versatile crop used for oil and fibers, was also found. The main cultivated plants are hulled emmer wheat (*Triticum turgidum* subsp. *dicoccum*) and barley (*Hordeum vulgare*). The most significant pulses were lentils (*Lens culinaris*), followed by fava beans (*Vicia faba)*, chickpeas (*Cicer arietinum*), and grass peas (*Lathyrus sativus*). Fruits, such as olives (*Olea europaea*), figs (*Ficus carica*), and almonds (*Amygdalus communis/korschinskii)* were also essential components of the diet. In addition, numerous weeds, other wild plant species, and charred wood remains were found, providing us with important information for environmental, economic, and agricultural reconstructions.

3. Discussion

The cultural landscape of the southern Levant during the 6th and early 5th millennia BCE is characterized by regional diversity, which consists of micro-regional settlement clusters with locally based subsistence economies and distinct material cultures (Gopher and Gophna 1993; Rowan and Golden 2009; Gopher 2012: 1525–1597). The transition from the Early to the Middle Chalcolithic period (ca. 5300/5200 BCE; Rosenberg et al. 2014; 2023; Streit and Garfinkel 2015; Rosenberg, Galili, and Langgut 2023) is one of the least-known episodes within this timeframe. Much of this is due to the paucity of sites with undisturbed Middle Chalcolithic-period strata. Comparatively, the Early Chalcolithic period is better known and more extensively studied (cf. Garfinkel 1999; Gopher 2012).

Notably, several sites in the Jordan Valley, such as Kataret es-Samra, Tell esh-Shunah North, and Tell Abu Habil, produced ceramic elements similar to those observed at Tel Tsaf, namely sherds bearing the Tel Tsaf decoration (e.g., Garfinkel 1999: 186–188). However, we presently have very little information about the relevant strata and their material culture (e.g., de Contenson 1960; Leonard 1985; 1989; 1992; Gustavson-Gaube 1986; Philip and Baird 1993; Baird and Philip 1994). In contrast, since first being excavated in the late 1970s (Gophna and Sadeh 1988–1989; Garfinkel, Ben-Shlomo, and Freikman 2020) and until today (Rosenberg et al. 2023 and references therein), Tel Tsaf produced an abundance of information, constituting it as the leading site for studying the Middle Chalcolithic period. The site provides ample evidence concerning all aspects of this period in the Jordan Valley, and by looking closely at its early levels, one can explore the characteristics of the earliest phases of the Middle Chalcolithic period and its relationship with the preceding Early Chalcolithic period.

The material culture of the earliest levels at Tel Tsaf shows several similarities and differences from that of the Early Chalcolithic period. For example, the pottery assemblage, even though modest in size, has few characteristics that could be considered typical Early Chalcolithic, Wadi Rabah culture hallmarks: bow rim jars, DFBW, hemispherical bowls, plain burnish, and stamped and incised decoration (e.g., Kaplan 1958; Banning 2007a; Getzov et al. 2009b; Rosenberg, Getzov, and Assaf 2010; Gopher and Eyal 2012b: 374; 2012c: 567–579; Rosenberg et al. 2017). Moreover, only ca. 5% of sherds were slipped and burnished, and only six were typical DFBW (including three likely deriving from a single vessel). These characteristics also occurred in low frequencies in the later strata of the site (e.g., Shooval, Klimscha, and Rosenberg 2021).

On the other hand, the early pottery assemblage features several characteristics commonly ascribed to the Middle Chalcolithic period (e.g., Gophna and Sadeh 1988–1989; Garfinkel 1999; Hruby, Klimscha, and Rosenberg, forthcoming; see also Freikman, Ben-Shlomo, and Garfinkel 2024). These include V-shaped bowls, thumb-impressed and other rope decorations, and the frequent use of slip (especially red). Notably, V-shaped bowls became increasingly abundant through Tel Tsaf's upper levels.

The early appearance of the Tel Tsaf decoration style, which reflects a regional phenomenon almost exclusive to central Jordan Valley sites (cf. Hruby, Klimscha, and Rosenberg 2024), can now be securely positioned at the settlement's beginning (ca. 5300–5200 BCE). In fact, these early instances

of the Tel Tsaf decoration already feature its most prominent motifs: cross-hatched and hatched bands, solid or cross-hatched diamonds, and an upward-facing herringbone/zigzag pattern. Thus, the stylistic variability and dynamics characterizing the Tel Tsaf decoration at the site's upper levels were already in place in the earliest occupational strata, seemingly drawing on some ideas from the ceramic repertoire of the Halaf-Ubaid transition (see Streit and Garfinkel 2015; Hruby, Klimscha, and Rosenberg 2024; forthcoming). These very early examples indicate that the development of the Tel Tsaf decoration was intertwined with the settlement's emergence and the distinct socio-cultural entity that inhabited the Middle Jordan Valley for the next 500–600 years.

Interestingly, the whitewash surface treatment, which is common both in the late Tel Tsaf phases (Shooval, Klimscha, and Rosenberg 2021; ruby, Klimscha, and Rosenberg 2024) and other Middle Chalcolithic assemblages (e.g., Garfinkel 1999: 184, and references therein), does not appear in the early assemblage, implying that it developed later. All in all, and notwithstanding its size, Tel Tsaf 's early pottery assemblage seems to resemble quite closely the site's later assemblages (regarding typology, decoration, and Tel Tsaf decoration in particular). While some typological characteristics may reflect continuity from the Early Chalcolithic period, the assemblage clearly breaks with this tradition concerning its decorative motifs. The presence of Tel Tsaf decoration from the settlement's beginning reinforces this notion.

While the lithic assemblage is too small to enable a comprehensive comparison to the later phases of the site (Gopher 1988–1989; Dag and Garfinkel 2007), a few comments *vis à vis* the Early Chalcolithic lithic industries can be made. To begin with, the clear presence of blades and blade tools aligns with the late Wadi Rabah or post-Wadi Rabah assemblages (Barkai and Gopher 1999; Nativ et al. 2014). The microliths also better align with the Early Chalcolithic concerning the paucity of translucent raw material, which is more common in the Late Chalcolithic period (e.g., Gilead 1984; Shimelmitz 2007). Blades formed with indirect percussion are more familiar in the Late Chalcolithic period (Vardi 2012) and have also been noted in the site's later phases. Thus, Tel Tsaf presents a very early south Levantine instance of blades produced with indirect percussion (see also Rosenberg et al. 2017). The side-blow-blank flakes are rare in the southern Levant, albeit more familiar from the Late Chalcolithic period (Vardi and Gilead 2011). As both

indirect blade percussion and side-blow-blank flakes are rare in the southern Levant during the Early Chalcolithic period and are more common in the northern Levant already in the late Pottery Neolithic period (Nishiaki 1996; 2000), the question whether Tel Tsaf holds a significant role in this development remains open.

While the ground stone tool assemblage is too limited to provide evidence for any continuation or break, the two beads and the small fluorapatite chunk are all features characteristic of the site's later strata, reflecting exchange in exotic raw materials (see also Garfinkel, Ben-Shlomo, and Kuperman 2009; Liu et al. 2022; Rosenberg et al. 2022a; 2022c; 2023).

The small faunal assemblage offers new insights into human-animal interactions at Tel Tsaf over time. Evidence of burning indicates that human activities with fire altered some early refuse at the site. The assemblage comprised remains of wild and domesticated ungulates, primarily caprines and pigs, alongside relatively few specimens securely identified as wild gazelle or cattle. Some fox remains and a few very small animals were also identified. Although the identified faunal sample is small, its low cattle frequencies set it apart from previously studied samples. Still, a high abundance of caprine remains characterizes the site's early and later occupational phases (Hill 2011), reflecting these species' continued importance for subsistence.

The composition of major domesticates at early Tel Tsaf is unlike those of most Early Chalcolithic sites featuring higher ratios of cattle (e.g., Horwitz 1987; 2002; Horwitz, Galili, and Lernau 2006). The early levels at Tel Tsaf also differ from most Early Chalcolithic site assemblages, presenting higher ratios of caprine remains (e.g., Davis 2012; Khalaily et al. 2016). Caprine-to-gazelle ratios reflect a more intensive use of domesticated ungulates, and a comparison of early and late assemblages demonstrates that the frequency of caprine relative to gazelle increases over time. Additionally, gazelle remains in the assemblage support the findings from other sites that wild ungulate hunting also persisted after the introduction of controlled domesticates in the Pre-Pottery Neolithic B and Pottery Neolithic periods (Munro et al. 2018).

One of the unique aspects of early Tel Tsaf is the abundance of small game animals, featuring frequencies higher than those detected in the site's late phases and most Wadi Rabah sites. This pattern is attributable to the different recovery methods used for the current project. The paucity of fish bones supports previous hypotheses that fish played a minor dietary role at Tel Tsaf

despite its proximity to the Jordan River and other nearby water sources (e.g., Hill 2011; Rosenberg et al. 2014; Chasan et al. 2022).

The botanic assemblage includes nine edible species and seems to continue trends pertaining to the crystallization of the Mediterranean diet, which had begun in the Early Chalcolithic period (Rosenberg and Klimscha 2018; Chasan et al. 2022; Rosenberg et al. 2023). Hulled emmer wheat, barley, lentils, fava beans, chickpeas and grass peas, together with olives, figs and almonds, were all important components in the diet of the site's early inhabitants. The presence of flax may indicate that they were using this crop for oil production or fibers.

Summing up, the first settlement at Tel Tsaf can now be dated to around 5300 cal. BCE, which chronologically comes close to or overlaps with sites previously dated to the Early Chalcolithic period (e.g., Gilead 1990; 2007; 2009; Gopher and Gophna 1993; Joffe and Dessel 1995; Bourke 1997; Garfinkel 1999; 2009; Banning 2002; 2007a; 2007b; Blackham 2002; Yannai 2002; Golan 2006; Lovell, Dollfus, and Kafafi 2007; Getzov et al. 2009b; Gopher 2012; 2019; Rosenberg, Galili, and Langgut 2023). This seems to be partly reflected in the early levels' assemblage.

While most components of the material culture assemblage are too small to explore the link between the early levels at Tel Tsaf and the Early Chalcolithic period, the pottery assemblage seems sufficiently robust to support such an attempt. It appears that vessel morphologies in early Tel Tsaf are similar to those of the Early Chalcolithic period (with notable lacks); however, the Tel Tsaf decoration has no predecessors in the region and reflects the heterogeneity of stylistic choices and design patterns. Thus, while vessel morphology has, by and large, local affinities, it seems that we should seek the roots of the Tel Tsaf decoration elsewhere, probably in Early Ubaid or Halaf-Ubaid transition sites in northern Mesopotamia (e.g., Streit and Garfinkel 2015; Freikman, Ben-Shlomo, and Garfinkel 2024; Hruby, Klimscha, and Rosenberg 2024; forthcoming). While we still lack clear indications of the nature of Tel Tsaf 's interregional ties, it is clear that the site, almost from its beginning, was a hub of long-distance contacts (e.g., Garfinkel et al. 2014; Streit 2020; Liu et al. 2022; Rosenberg et al. 2022a; 2022c).

So, how should we perceive the cultural phenomena at early Tel Tsaf, late Tel Tsaf, and the Middle Jordan Valley as a whole? Without getting into the local turmoil and frequently inconsistent definitions of local periods and archaeological cultures, and without designating the basic local cultural (as opposed to abstract periodic, *Neolithic* and *Chalcolithic*) units, it seems that we should accept that cultural entities could show flexibility and be dynamic.

We should also consider a clearer definition of a cultural entity (in terms of characteristics and variability) across its time span, as it borrows elements from a wide range of cultural sources and develops new and somewhat hybrid cultural entities across different geographic and ecological settings.

As Gopher (2019: 103) recently suggested, "This is the case with respect to the Wadi Rabah entity including its later manifestations as it evolved into the small subregional PoWR-PG entities that exhibit a significantly different character and a new spirit when compared to the preceding Wadi Rabah (at best, the PoWR-PG assemblages yield only a little of the Wadi Rabah material culture elements)." While the evidence stemming from the early levels at Tel Tsaf suggests some links with the local Early Chalcolithic traditions, it is still unclear to what extent these links are entangled with different characteristics of, for example, the Wadi Rabah culture and its different facies, or why the assemblage reflects distancing away from these traditions (the lack of some key characteristics). Notwithstanding these caveats, we tend to support the hypothesis that communities developed locally in the Central Jordan Valley, forging particular cultural markers while drifting away from the, until then, dominant local tradition of the Wadi Rabah culture (Kaplan 1958; Gopher 2019).

While the cultural background of the early settlers at Tel Tsaf demands that more evidence be produced from the earliest levels of the site (presently resting under 2.5–3.0 m of accumulations), it is interesting to note the occurrence of Late Chalcolithic-period characteristics (e.g., V-shaped bowls, rope decoration). Additional Late Chalcolithic characteristics will soon after be seen in, for example, rectangular architecture, increased storage capacity (silos), metallurgy (copper awl), ceramics (e.g., types, decoration), flint (types and technology), ground stone tools (typology and probably also technology), and imagery (proto-violin figurines). We can also detect aspects typical of the Late Chalcolithic period in the botanical and faunal assemblages; however, conclusions regarding their characteristics and intensity await the completion of the detailed analyses. In addition, evidence was noted for continuity in culinary behavior pertaining to the use of meat and plants, dairy products, and alcoholic beverages (e.g., Rosenberg et al. 2021; Chasan et al. 2022; Chasan, Spiteri, and Rosenberg 2022).

Considering the above, it is evident that we can detect the roots of some Late Chalcolithic-period features at Tel Tsaf. Thus, some of the answers to the long-lasting questions regarding the origin of Late Chalcolithic-period cultures can be found at sites like Tel Tsaf, Kataret es-Samra, Tell esh-Shunah North, Tell Abu Habil. Interestingly, while we have evidence for Late

Chalcolithic characteristics throughout most of the sequence of Tel Tsaf, the latest stratum at the site does not reflect any evidence of full-blown Ghassulian material culture assemblages, nor does it provide any hint as to why the site was abandoned around 4700 BCE.

Acknowledgments

The Tel Tsaf research project was conducted under Israel Antiquities Authority Permits G-43/2013, G-8/2015, G-18/2015, G-46/2016, G-39/2017, G-20/2018, G-45/2019, G-43/2020, G-4/2021, G-5/2022, G-2/2023. This work was supported by the Israel Science Foundation (ISF grant 2016/17), the Rust Family Foundation, the Irene Levi-Sala CARE Foundation, The Foundation for the Study and Preservation of Tells in the Prehistoric Old World (FSPT), the Eurasia Department of the German Archaeological Institute (DAI) in Berlin, and the Zinman Institute of Archaeology, University of Haifa. We thank S. Haad for her assistance with the graphics and S. Palstra and M. Dee for the 14C analyses.

References

Abe, Y., Marean, C. W., Nilssen, P. J., Assefa, Z., and Stone, E. C. 2002. The Analysis of Cutmarks on Archaeofauna: A Review and Critique of Quantification Procedures and a New Image-Analysis GIS Approach. *American Antiquity* 67: 643–663.

Agha, N., Nadel, D., and Bar-Oz, G. 2019. New Insights into Livestock Management and Domestication at Tel Ro'im West, a Multi-layer Neolithic Site in the Upper Jordan Valley, Israel. *Journal of Archaeological Science: Reports* 27: 101991.

Anfinset, N., Taha, H., Al-Zawahra, M., and Yasine, J. 2011. Societies in Transition: Contextualizing Tell el Mafjar, Jericho. Pp. 97–113 in *Culture, Chronology and the Chalcolithic: Theory and Transition*, eds. J. Lovell, and Y. Rowan. Oxford: Oxbow Books.

Banning E. B. 2002. Consensus and Debate on Late Neolithic and Chalcolithic of the Southern Levant. *Paléorient* 28: 148–155.

Banning E. B. 2007a. Time and Tradition in the Transition from Late Neolithic to Chalcolithic: Summary and Conclusions. *Paléorient* 33/1: 137–142.

Banning, E. B. 2007b. Wadi Rabah and Related Assemblages in the Southern Levant: Interpreting the Radiocarbon Evidence. *Paléorient* 33/1: 77–101.

Baird, D. and Philip, G. 1994. Preliminary Report on the Third (1993) Season of Excavations at Tell esh-Shuna North. *Levant* 26: 111–133.

Barkai, R. and Gopher, A. 1999. The Last Neolithic Flint Industry: A Study of the Technology, Typology and Social Implications of the Lithic Assemblage from Nahal Zehora I, a Wadi Rabah (Pottery Neolithic) Site in the Menashe Hills, Israel. *Journal of the Israel Prehistoric Society* 29: 41–122.

Barzilai, O., Getzov, N., Gubenko, N., Marom, N., Milevski, I., Vered, A., and Zheng, J. 2013. Proto-Historic Ein Zippori: The 2007 Excavation Season. *Journal of the Israel Prehistoric Society* 43: 22–72.

Blackham, M. 2002. *Modeling Time and Transition in Prehistory: The Jordan Valley Chalcolithic (5500– 3500 BC)*. BAR International Series 1027. Oxford: Archaeopress.

Bourke, S. J. 1997. The 'Pre-Ghassulian' Sequence at Teleilat Ghassul. Pp. 395– 417 in *The Prehistory of Jordan* II: *Perspectives from 1997*, ed. H.G.K. Gebel, Z. Kafafi, and G. Rollefson. Studies in Early Near Eastern Production, Subsistence, and Environment 4 Berlin: Ex Oriente.

Chasan, R., Klimscha, F., Spiteri, C., and Rosenberg, D. 2022. Foodways of an Agro-Pastoral Community: Organic Residue Analysis of Pottery and Stone Vessels at the Middle Chalcolithic Tel Tsaf. *Journal of Archaeological Science: Reports* 43: 103491. https://doi. org/10.1016/j.jasrep.2022.103491.

Chasan, R., Rosenberg, D., Klimscha, F., Beeri, R., Golan, D., Dayan, A., Galili, E., and Spiteri, C. 2021. Bee Products in the Prehistoric Southern Levant: Evidence from the Organic Lipid Record. *Royal Society Open Science* 8: 210950.

Chasan, R., Spiteri, C. and Rosenberg, D. 2022. Dietary Continuation in the Southern Levant: A Neolithic-Chalcolithic Perspective Through Organic Residue Analysis. *Journal of Archaeological and Anthropological Sciences* 14: 49.

Cohen, A. and Serjeantson, D. 1996. *A Manual for the Identification of Bird Bones from Archaeological Sites*. London: Archetype Publications.

Contenson, H. de. 1960. Three Soundings in the Jordan Valley. *Annual of the Department of Antiquities of Jordan* 4–5: 12–56.

Dag, D. and Garfinkel, Y. 2007. The Flint Industry of Tel Tsaf: A Middle Chalcolithic Site in the Jordan Valley, Israel. *Journal of the Israel Prehistoric Society* 37: 381–417.

Davis, S. J. M. 2012. Animal Bones at the Nahal Zehora Sites. Pp. 1258–1320 in *Village Communities of the Pottery Neolithic Period in the Menashe Hills, Israel: Archaeological Investigations at the Sites of Nahal Zehora*, ed. A. Gopher. Monograph Series 29. Tel Aviv: Emery and Claire Yass Publications in Archaeology.

Dollfus, G. and Kafafi, Z., 1993. Recent Researches at Abu Hamid. *Annual of the Department of Antiquities of Jordan* 37: 241–262.

Fernandes, P., Raynal, J. P., and Moncel, M. H. 2008. Middle Palaeolithic Raw Material Gathering Territories and Human Mobility in the Southern Massif Central, France: First Results from a Petro-archaeological Study on Flint. *Journal of Archaeological Science* 35: 2357–2370.

Freikman, M., Ben-Shlomo, D., and Garfinkel, Y. 2024. *Excavations at Tel Tsaf 2004–2007: Final Report*, Volume 2. Ariel: Ariel University Press.

Garfinkel, Y. 1999. *Neolithic and Chalcolithic Pottery of the Southern Levant*. Qedem 39. Jerusalem: Institute of Archaeology, Hebrew University of Jerusalem.

Garfinkel Y. 2009. The Transition from Neolithic to Chalcolithic in the Southern Levant: The Material Culture Sequence. Pp. 325–333 in *Transitions in Prehistory: Essays in Honor of Ofer Bar-Yosef*, eds. J. J. Shea and D. E. Lieberman. Oxford: Oxbow Books.

Garfinkel, Y. 2014. The Levant in the Pottery Neolithic and Chalcolithic Periods. Pp. 1439–1461 in *Cambridge World Prehistory*, Vol. 3: *West and Central Asia and Europe*, ed. C. Renfrew and P. Bahn. New York: Cambridge University Press.

Garfinkel, Y., Ben-Shlomo, D., and Freik man, M. 2020. *Excavations at Tel Tsaf 2004–2007: Final Report*, Volume 1. Ariel: Ariel University Press.

Garfinkel, Y., Ben-Shlomo D., and Kuperman, T. 2009. Large-Scale Storage of Grain Surplus in the Sixth Millennium BC: The Silos of Tel Tsaf. *Antiquity* 83: 309–325.

Garfinkel, Y., Klimscha, F., Shalev, S., and Rosenberg, D. 2014. The Beginning of Metallurgy in the Southern Levant: A Late 6th Millennium CalBC Copper Awl from Tel Tsaf, Israel. *PLoS ONE* 9/4: e92591. https://doi.org/10.1371/journal.pone.0096882.

Getzov, N., Barzilai, O., Dosseur, G., Eirikh-Rose, A., Katlav, I., Marder, O., Marom, N., and Milevski, I. 2009a. Nahal Betzet II and Ard el-Samra: Two Late Prehistoric Sites and Settlement Patterns in the Akko Plain. *Journal of the Israel Prehistoric Society* 39: 81–158.

Getzov, N., Lieberman-Wander, R., Smithline, H., and Syon, D. 2009b. *Horbat 'Uza: The 1991 Excavations*, Volume I: *The Early Periods*. IAA Reports 41. Jerusalem: Israel Antiquities Authority.

Gilead, I. 1984. The Micro-Endscraper: A New Tool Type of the Chalcolithic Period. *Tel Aviv* 11: 3–10.

Gilead, I. 1990. The Neolithic-Chalcolithic Transition and the Qatifian of the Northern Negev and Sinai. *Levant* 22: 47–63.

Gilead, I. 2007. The Besorian: A Pre-Ghassulian Cultural Entity. *Paléorient* 33/1: 33–49.

Gilead, I. 2009. The Neolithic-Chalcolithic Transition in the Southern Levant: Late Sixth-Fifth Millennium Culture History. Pp. 335–355 in *Transitions in Prehistory: Essays in Honor of Ofer Bar-Yosef*, eds. J. J. Shea and D. E. Lieberman. Oxford: Oxbow Books.

Golan, S. 2006. The Nazur Culture, A Lithic Perspective: A Case Study from the Site Nazur 4—The End of the Pottery Neolithic or the Beginning of the Chalcolithic. Unpublished MA thesis, Tel Aviv University (Hebrew).

Gopher, A. 1988–1989. The Flint Assemblages from Tel Tsaf. *Tel Aviv* 15–16: 37–46.

Gopher, A. 2012. The Pottery Neolithic in the Southern Levant: A Second Neolithic Revolution. Pp. 1525–1581 in *Village Communities of the Pottery Neolithic Period in the Menashe Hills, Israel: Archaeological Investigations at the Sites of Nahal Zehora*, ed. A., Gopher. Monograph Series 29. Tel Aviv: Emery and Claire Yass Publications in Archaeology.

Gopher, A. 2019. Unresolved Pottery Neolithic Chrono-Stratigraphic and Chrono-Cultural Issues: Comments on the Beginning and the End of the Pottery Neolithic Period. Pp. 96–108 in *"Isaac went out to the field": Studies in Archaeology and Ancient Cultures in Honor of Isaac Gilead*, ed. H. Goldfus, M. I. Mayer, Y. Shamir, and P. Fabian. Oxford: Archaeopress Publishing Ltd.

Gopher, A. and Eyal, R. 2012a. Analyzing PN Pottery Assemblages: Background and Methodological Aspects. Pp. 338–358 in *Village Communities of the Pottery Neolithic Period in the Menashe Hills, Israel: Archaeological Investigations at the Sites of Naḥal Zehora*, ed. A. Gopher. Monograph Series 29. Tel Aviv: Emery and Claire Yass Publications in Archaeology.

Gopher, A. and Eyal, R. 2012b. Pottery Variability and Change Over Time: Density per Excavated Volume. Pp. 555–580 in *Village Communities of the Pottery Neolithic Period in the Menashe Hills, Israel: Archaeological Investigations at the Sites of Naḥal Zehora*, ed. A. Gopher. Monograph Series 29. Tel Aviv: Emery and Claire Yass Publications in Archaeology.

Gopher, A. and Eyal, R. 2012c. The Pottery Assemblages at the Naḥal Zehora Sites: A Summary Pp. 697–742 in *Village Communities of the Pottery Neolithic Period in the Menashe Hills, Israel: Archaeological Investigations at the Sites of Naḥal Zehora*, ed. A. Gopher. Monograph Series 29. Tel Aviv: Emery and Claire Yass Publications in Archaeology.

Gopher, A. and Gophna, R. 1993. Cultures of the Eighth and Seventh Millennia BP in the Southern Levant: A Review for the 1990s. *Journal of World Prehistory* 7: 297–353.

Gophna, R. and Sadeh, S. 1988–1989. Excavations at Tel Tsaf: An Early Chalcolithic Site in the Jordan Valley. *Tel Aviv* 15–16: 3–36.

Goren, Y. 1991. The Beginnings of Pottery Production in Israel: Technology and Typology of Proto-Historic Ceramic Assemblages in Eretz-Israel (6th–4th Millennia BCE). Unpublished PhD dissertation, The Hebrew University, Jerusalem (Hebrew).

Groman-Yaroslavski, I., Barshay, K., Klimscha, F., Garfinkel, Y., and Rosenberg, D. 2024. Sickle Construction Technologies at Middle Chalcolithic Tel Tsaf, Jordan Valley, Israel. *Archaeological and Anthropological Sciences* 16: Article 30. https://doi.org/10.1007/s12520-023-01931-0.

Gustavson-Gaube C. 1986. Tell Esh-Shuna North 1985: A Preliminary Report. *Annual of the Department of Antiquities of Jordan* 30: 69–113.

Hill, A. C. 2011. Specialized Pastoralism and Social Stratification—Analysis of the Fauna from Chalcolithic Tel Tsaf, Israel. Ph.D. dissertation, University of Connecticut.

Hillson, S. 1996. *Mammal Bones and Teeth: An Introductory Guide to Methods of Identification*. London: Institute of Archaeology University College London.

Horwitz, L. K. 2002. Fauna from the Wadi Rabah Site of Abu Zureiq. *Israel Exploration Journal* 52: 167–178.

Horwitz, L. K. 1987. Animal Remains from the Pottery Neolithic Levels at Tel Dan. *Journal of the Israel Prehistoric Society* 20: 114–118.

Horwitz, L. K., Galili, E., and Lernau, O. 2006. Fauna from the Submerged Pottery Neolithic Site of Newe Yam, Northern Israel. *Journal of the Israel Prehistoric Society* 36: 139–171.

Hruby, K., Klimscha, F., and Rosenberg, D. 2024. The Tel Tsaf Decoration: Contextualizing a Chalcolithic Pottery Phenomenon on a Regional Scale. *Archaeological Research in Asia* 40: 100541.

Hruby, K., Kowalewska, A., Rosenberg, D., and Eisenberg, M. 2024. A Chalcolithic Presence East of the Sea of Galilee: The Earliest Finds on Mt. Sussita. *Palestine Exploration Quarterly*. https://doi.org/10.1080/00310328.2023.2277625.

Joffe, A. H. and Dessel, J. P. 1995. Redefining Chronology and Terminology for the Chalcolithic of the Southern Levant. *Current Anthropology* 36: 507–518.

Kaplan, J. 1958. Excavations at Wadi Rabah. *Israel Exploration Journal* 8: 149–160.

Kaplan, J. 1969. 'Ein el Jarba: Chalcolithic Remains in the Plain of Esdraelon. *Bulletin of the American Schools of Oriental Research* 194: 2–39.

Khalaily, H., Milevski, I., Horwitz, L. K., and Marder, O. 2016. Early Wadi Rabah and Chalcolithic Occupations at Tel Dover: Environmental and Chronological Insights. Pp. 109–154 in *From Sha'ar Hagolan to Shaaraim: Essays in Honor of Prof. Yosef Garfinkel*, ed. K. Streit and M. Mumcuoglu. Jerusalem: Israel Exploration Society.

Kościuk-Załupka, J., Michalik, M., Klimscha, F., Rosenberg, D. Forthcoming. Provenancing Middle Chalcolithic Ochre from the Jordan Valley: A Case Study from Tel Tsaf, Israel. *Journal of Archaeological Science*.

LeMoine, G. M. 2010. Use Wear on Bone and Antler Tools from the Mackenzie Delta, Northwest Territories. *American Archaeology* 59: 316–334.

Leonard A. Jr. 1985. The Kataret es-Samra Project: 1985. *Annual of the Department of Antiquities of Jordan* 29: 289–290.

Leonard A. Jr. 1989. A Chalcolithic "Fine Ware" from Kataret es-Samra in the Jordan Valley. *Bulletin of the American Schools of Oriental Research* 276: 3–14.

Leonard A. Jr. 1992. *The Jordan Valley Survey, 1953: Some Unpublished Soundings Conducted by James Mellaart*. Annual of the American Schools of Oriental Research 50. Winona Lake: Eisenbrauns.

Liu, L., Levin, M., Klimscha, F., and Rosenberg D. 2022. The Earliest Cotton Fibers and Pan-Regional Contacts in the Near East. *Frontiers in Plant Sciences* 13: 1045554. https://doi.org/10.3389/fpls.2022.1045554.

Lovell J. L. 2001. *The Late Neolithic and Chalcolithic Periods in the Southern Levant: New Data from the Site of Teleilat Ghassul, Jordan*. BAR International Series 974. Oxford: Archaeopress. Lovell J. L., Dollfus G., and Kafafi Z. 2007. The Ceramics of the Late Neolithic and Chalcolithic: Abu Hamid and the Burnished Tradition. *Paléorient* 33/1: 51–76.

Lupo, R. and Dayan, A. 2015. Tell Qasile (North): Remains of a Pre-Ghassulian Structure on Fichmann Street, Tel Aviv. *'Atiqot* 82: 131–139.

Milevski, I., Lupu, R., and Bischoff, E. 2020. The Late Pottery Neolithic/Early Chalcolithic Period at Motza and Its Surroundings: A New Horizon Emerging in the Judean Hills. Pp. 241–264 in *The Mega Project at Motza (Moẓa): The Neolithic and Later Occupations up to the 20th Century*, ed. H. Khalaily, A. Re'em, J. Vardi, and I. Milevski. Jerusalem: Israel Antiquities Authority.

Milevski, I., Marder, O., Mienis, H. K., and Horwitz, L. K. 2015. Abu Ghosh, Jasmine Street: A Pre-Ghassulian Site in the Judean Hills. *'Atiqot* 8: 85–130.

Munro, N. D., Bar-Oz, G., Meier, J. S., Sapir-Hen, L., Stiner, M. C., and Yeshurun, R. 2018. The Emergence of Animal Management in the Southern Levant. *Scientific Reports* 8: Article 9279.

Namdar, L., Vardi, J., Paz, Y., and Sapir-Hen, L. 2021. Variation in Economic Specialisation as Revealed Through the Study of Pottery Neolithic Faunal Assemblages from the Southern Levant. *Archaeological and Anthropological Sciences* 13: 1–19.

Nativ, A., Shimelmitz, R., Agha, N., Katlav, I., and Rosenberg, D. 2014. Hanaton: Interim Report on a Neolithic-Chalcolithic Settlement in the Lower Galilee. *Journal of the Israel Prehistoric Society* 44: 117–147.

Nishiaki, Y. 2000. *Lithic Technology of Neolithic Syria*. BAR International Series 840. Oxford: BAR.

Nishiaki, Y. 1996. Side-Blow Blade-Flakes from Tell Kashkashok II, Syria: A Technological Study. Pp. 311–327 in *Neolithic Chipped Stone Industries of the Fertile Crescent and Their Contemporaries in Adjacent Regions*, ed. S. K. Kozłowski and H. G. K. Gebel. Berlin: Ex Oriente.

Philip, G. and Baird, D. 1993. Preliminary Report on the Second (1992) Season of Excavations at Tell esh-Shuna North. *Levant* 25: 13–36.

Rice, P. M. 2015. *Pottery Analysis: A Sourcebook, Second Edition*. Chicago: The University of Chicago Press.

Rosenberg, D., van den Brink, E. C. M., Shimelmitz, R., Nativ, A., Mienis, H. K., Shamir, O., Chasan, R., and Shooval, T. 2017. Pits and Their Contents: The Wadi Rabah Site of Qidron in the Shephela, Israel. *Journal of the Israel Prehistoric Society* 47: 33–147.

Rosenberg, D., Elkayam, Y., Garfinkel, Y., Klimscha, F., Vučković, V., and Weiss, Y. 2022a. Long-distance Trade in the Middle Chalcolithic of the Southern Levant: The Case of the Olivine Beads from Tel Tsaf, Jordan Valley, Israel. *PLoS ONE* 17: e0271547.

Rosenberg, D., Galili, E., and Langgut, D. 2023. The Unseen Record: Ninth–Seventh Millennia Cal. BP Wooden and Basketry Objects from Submerged Settlements off the Carmel Coast, Israel. *Forests* 14: 2373.

Rosenberg, D., Getzov, N., and Assaf, A., 2010. New Light on Long-distance Ties in the Late Neolithic/Early Chalcolithic Near East: The Chlorite Vessels from Hagoshrim, Northern Israel. *Current Anthropology* 51: 281–293.

Rosenberg, D. and Klimscha, F. 2018. Prehistoric Dining at Tel Tsaf. *Biblical Archaeological Review* 44/4: 54–55.

Rosenberg, D. and Klimscha, F. 2021. Social Complexity and Ancient Diet: The Renewed Research Project at Tel Tsaf, Jordan Valley. *Qadmoniot* 161: 12–17 (Hebrew).

Rosenberg, D., Klimscha, F., Graham, P., Hill, C., Weissbrod, L., Katlav, I., Love, S., Boaretto, E., Pinsky, S., and Hubbard, E. 2014. Back to Tel Tsaf: A Preliminary Report on the 2013 Season of the Renewed Project. *Journal of the Israel Prehistoric Society* 44: 148–179.

Rosenberg, D., Ktalav, I., Groman-Yaroslvski, I., and Klimscha, F. 2022b. Unique Theodoxus Jordani Shell Beads from the Middle Chalcolithic Site of Tel Tsaf (c. 5,200–4,700 cal BC), Jordan Valley, Israel. *Archaeological Research in Asia* 29: 1–9.

Rosenberg, D., Garfinkel, Y., and Klimscha F. 2017. Large Scale Storage and Storage Symbolism in the Ancient Near East: A Clay Silo Model from Tel Tsaf. *Antiquity* 358: 885–900.

Rosenberg, D., Levine, M., Klimscha, F., Shalem, D., and Liu, L. 2021. From Hangovers to Hierarchies: Beer Production and Use During the Chalcolithic Period of the Southern Levant—New Evidence from Tel Tsaf and Peqi'in Cave. *Journal of Anthropological Archaeology* 64: 1–17.

Rosenberg, D., Love, S., Hubbard, E., and Klimscha, F. 2020. 7,200 Years Old Constructions and Mudbrick Technology: The Evidence from Tel Tsaf, Jordan Valley, Israel. *PLoS ONE* 15: e0227288.

Rosenberg, D., Pinsky, I., Hruby, K., and Klimscha, F. 2023. Tel Tsaf, a Middle Chalcolithic Site in the Jordan Valley: An Interim Report on the 2013–2022 Excavation Seasons. *Journal of the Israel Prehistoric Society* 53: 208–241.

Rosenberg, D., Rizzuto, B., Klimscha, F., and Carter, T. 2022c. The Obsidian Beads from Middle Chalcolithic Tel Tsaf (c. 5,200–4,700 cal. BC), Jordan Valley, Israel: Technology, Provenance, and Socio-economic Significance. *Archaeological and Anthropological Sciences* 14: 113.

Rowan, Y. M. and Golden, J. 2009. The Chalcolithic Period of the Southern Levant: A Synthetic Review. *Journal of World Prehistory* 22: 1–92.

Schmidt, E. 1972. *Tierknochenatlas: Atlas of Animal Bones for Prehistorians, Archaeologists and Quaternary Geologists*. Amsterdam: Elsevier Publishing Company.

Shimelmitz, R. 2007. The Chalcolithic Lithic Assemblage. Pp. 77–87 in *Kafr Ana: A Rural Settlement in the Lod Valley*, ed. R. Gophna, I. Taxel, and A. Feldstein. Salvage Excavation Reports No. 4. Tel Aviv: Emery and Claire Yass Publications in Archaeology.

Shimelmitz, R. 2022. The Flint Assemblages: Changes in the Organisation of Flint Production through the Pottery Neolithic to the Chalcolithic Assemblages of Yesodot. Pp. 157–196 in *Yesodot: A Lodian, Wadi Rabah, Post-Ghassulian and Middle Bronze Age Site*, ed. A. Nativ and Y. Paz. Salvage Excavation Reports 11. Tel Aviv: Emery and Claire Yass Publications in Archaeology.

Shimelmitz, R., Kuhn, S. L., and Weinstein-Evron, M. 2020. The Evolution of Raw Procurement Strategies: A View from the Deep Sequence of Tabun Cave, Israel. *Journal of Human Evolution* 143: 102787.

Shooval, T., Klimscha, R., and Rosenberg, D., 2021. What Can One Room Tell Us? The Pottery Assemblage of Room C70 in Building CI at Tel Tsaf, Middle Jordan Valley, Israel. Pp. 283–306 in *Neolithic Pottery from the Near East: Production, Distribution and Use*, ed. R., Özbal, M., Erdalkiran, and Y. Tonoike. Antalya: Koç University Press.

Stiner, M. C. 2004. A Comparison of Photon Densitometry and Computed Tomography Parameters of Bone Density in Ungulate Body Part Profiles. *Journal of Taphonomy* 2/3: 117–145.

Stiner, M. C., Kuhn, S. L., Weiner, S., and Bar-Yosef, O. 1995. Differential Burning, Recrystallization, and Fragmentation of Archaeological Bone. *Journal of Archaeological Science* 22: 223–237.

Streit, K. 2020. *The Ancient Near East in Transregional Perspective: Material Culture and Exchange between Mesopotamia, the Levant, and Lower Egypt from 5,800 to 5,200 cal BC*. Archaeology of Egypt, Sudan and the Levant 2. Vienna: Austrian Academy of Sciences Press, Vienna.

Streit, K. and Garfinkel, Y. 2015. Tel Tsaf and the Impact of the Ubaid Culture on the Southern Levant: Interpreting the Radiocarbon Evidence. *Radiocarbon* 57/5: 1–15.

Tzori, N. 1958. Neolithic and Chalcolithic Sites in the Valley of Beth-Shan. *Palestine Exploration Quarterly* 90: 44–51.

Vardi, J. 2012. Sickle Blades and Sickles of the Sixth and Fifth Millennia BCE in Light of the Finds from the Chalcolithic Sickle Blade Workshop Site of Beit Eshel. Ph.D. dissertation, Ben-Gurion University (Hebrew with English summary).

Vardi, J. and Gilead, I. 2011. Side-Blow Blade-Flakes from the Ghassulian Sickle Blade Workshop of Beit Eshel: A Chalcolithic Solution to a Neolithic Riddle. Pp. 343–356 in *The State of the Stone: Terminologies, Continuities and Contexts in Near Eastern Lithics*, ed. E. Healey, S. Campbell, and O. Maeda. Berlin: Ex Oriente.

Yannai, E. 2002. The Northern Sharon in the Chalcolithic Period and the Beginning of the Early Bronze Age in Light of the Excavations at ʿEin Asawir, Pp. 65–86 in *Quest of Ancient Settlements and Landscapes: Archaeological Studies in Honour of Ram Gophna,* ed. E. C. M. van den Brink and E. Yannai. Tel Aviv: Ramot Publishing.

Zeder, M. A. and Lapham, H. A. 2010. Assessing the Reliability of Criteria Used to Identify Postcranial Bones in Sheep, Ovis, and Goats, Capra. *Journal of Archaeological Science* 37: 2887–2905.