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The Middle Bronze Age IIB Ground Stone Tool Assemblage from el-Munṭar el-Abyad

Danny Rosenberg and Barak Tzin

Introduction

The ground stone tool assemblage from el-Munṭar el-Abyad comprises 48 tools and tool fragments. Most of these (n = 33) were retrieved from loci assigned to the Middle Bronze Age IIB (Stratum III; see Atrash and Golani, this volume): thirteen tools from Stratum IIIA, nine from Stratum IIIB, and the rest (n = 11) from other contexts within this stratum. The remaining 15 items were found on the ground surface or originated in unsecure contexts. The 33 MB IIB items were found in loci defined as floors (n = 12, 36.4%), walls (n = 3, 9.2%), debris (n = 5, 15.1%), debris upon surface (n = 6, 18.1%), or surface makeup (n = 7, 21.2%). The small assemblage (Table 1) contains grinding stones, bowls and mortars, pestles and weights, and a few items cataloged as varia. In this report, we will focus on the items found in secure contexts. The entire assemblage is presented in the *Catalogue*, below.

Each tool in the assemblage underwent attribute analysis that included tool morphology, preservation and metrics (length, width and thickness), weight, cross-sections, production marks and use-wear. The primary raw material is basalt, divided into compact (non-vesicular) basalt and porous (vesicular) basalt, while other raw materials are rare.

Table 1. Breakdown of MB IIB Ground Stone Assemblage, by Type and Raw Material

Raw Material / Type	Non-Vesicular (Compact) Basalt	Vesicular (Porous) Basalt	Marble	Unknown	*Total*	
					N	%
Lower grinding tools	3	3			*6*	*18.1*
Upper grinding tools	5	11			*16*	*48.5*
Pestles	4				*4*	*12.2*
Bowls and mortars	2	2			*4*	*12.2*
Weights	1				*1*	*3.0*
Varia			1	1	*2*	*6.0*
Total	*15*	*16*	*1*	*1*	*33*	*100.0*
%	*45.5*	*48.5*	*3.0*	*3.0*		

THE ASSEMBLAGE

Lower Grinding Stones

The lower grinding stone is the non-portable tool in a set of grinding stones. These make up 18.1% of the assemblage (n = 6; Fig. 1:1, 2): Five are broken (MA2–MA7; MA5 and MA7 are two parts of the same tool and were thus counted as one), usually crosswise, and one is nearly whole (MA26). All the items can be classified as saddle-shaped basalt grinding stones or querns—three of compact basalt and three of vesicular basalt. A common feature (n = 5; MA3–MA6, MA26) is the angle between the active surface and the edges of the tool, representing a part of the tool that tilts from the active surface toward the side. The longitudinal section of these items is crescent-shaped. The average edge width is 27.8 cm (from one side of the tool to the other), and the average distance from the tool's end to the edge of the elevated part is 4.1 cm near the edges and 6.3 cm in the middle. The edges (9 cm average thickness) are about 30% thicker than the tools' middle part (6 cm average thickness). The original grinding surface of the tool was flat, and the crescent shape of the tilted part was formed through repeated grinding activities that wore down the grinding surface to its present form.

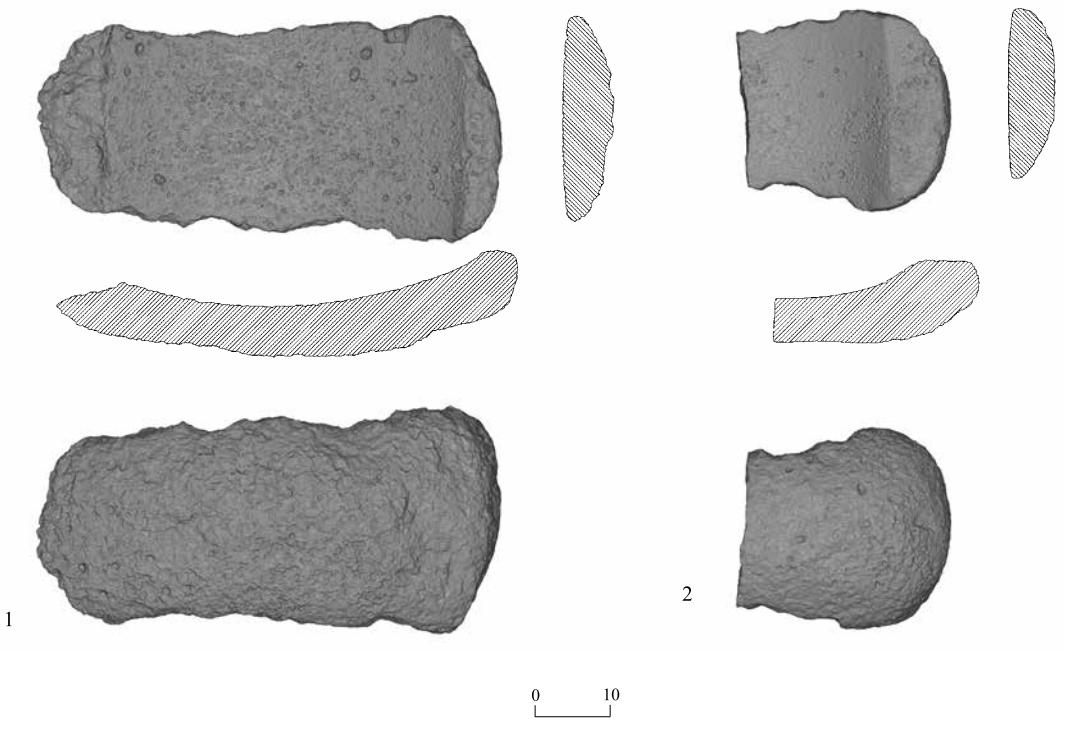

Fig. 1. Lower grinding stones with offset angle edge: (1) MA26; (2) MA4.

As most of the lower grinding stones are incomplete, metrics are restricted to the single nearly whole item (MA26; Fig. 1:1), which has a single elongated grinding surface and two rounded ends. Weighing 19.3 kg, it is 62 cm long and 27 cm wide, with a thickness varying from 8 cm in the middle to 6.5 cm near the ends. While difficult to verify because of their fragmented nature, most lower grinding stones in this assemblage appear to comply with the size and morphology of this item. Items MA4 (Fig. 1:2) and MA6 are lower grinding slabs with a two-level grinding surface. Item MA2 is a lower grinding stone with one surface. MA5 and MA7 are two parts of the same tool as both items were found together in L1413.

Production marks, usually visible on the edges of the tool, include scars and signs of pecking that are often visible on the base and/or the circumference. The edge was shaped into a crescent or maintained the original shape of the boulder. The production scars are mostly 2 cm in diameter, and it seems that the tool was shaped using the grinding surface as a 'striking platform.'

The smoothed areas on the bases probably reflect prolonged use and contact with the surfaces upon which the grinding stones were placed. Also, the convex characteristics of many bases may reflect the movement of the lower grinding stone while in use, when it was not affixed to the floor or an installation.

Use-wear is visible in the form of smoothening marks covering over 80% of the working surface of each grinding stone. Some parts are smoother than others, and sometimes polishing was also noted.

Upper Grinding Stones

The upper grinding stones make up 48.5% of the stone assemblage (n = 16; Fig. 2). Typologically, these are either loaf-shaped, with characteristic plano-convex cross sections (n = 12; MA9, MA11–13, MA15, MA17–22, MA25), or oval- and round-shaped small processors (n = 4; MA24, MA27–29).

Most loaf-shaped upper grinding stones (n = 11) are made of vesicular basalt (Fig. 2), and only one (MA15), of compact basalt; all are elongated, oval, and have a plano-convex cross section. Two of the loaf-shaped vesicular-basalt tools are whole or nearly whole (MA9 and MA11). Their weights, 8 and 6.1 kg respectively, together with their forms and lengths (45 cm on average), indicate that these were operated with both hands. Widths near the edges range from 9 to 13.5 cm and average 12 cm. Thickness near the edges ranges from 4 to 6 cm, with a 5 cm average. Since this average thickness also characterizes other parts along the tool's length, it can be assumed that the thickness was homogeneous and that the loaf-shaped upper grinding stones were used evenly, leading to the preservation of the tools' shapes throughout their life-history.

Most of the upper grinding stones are represented by broken end-fragments. Since no clear indications for deliberate breakage were noted, it may be assumed that most of the undamaged tools were taken from the site when it was abandoned. All items feature grinding and smoothening marks on their active surfaces, and occasionally, also on their

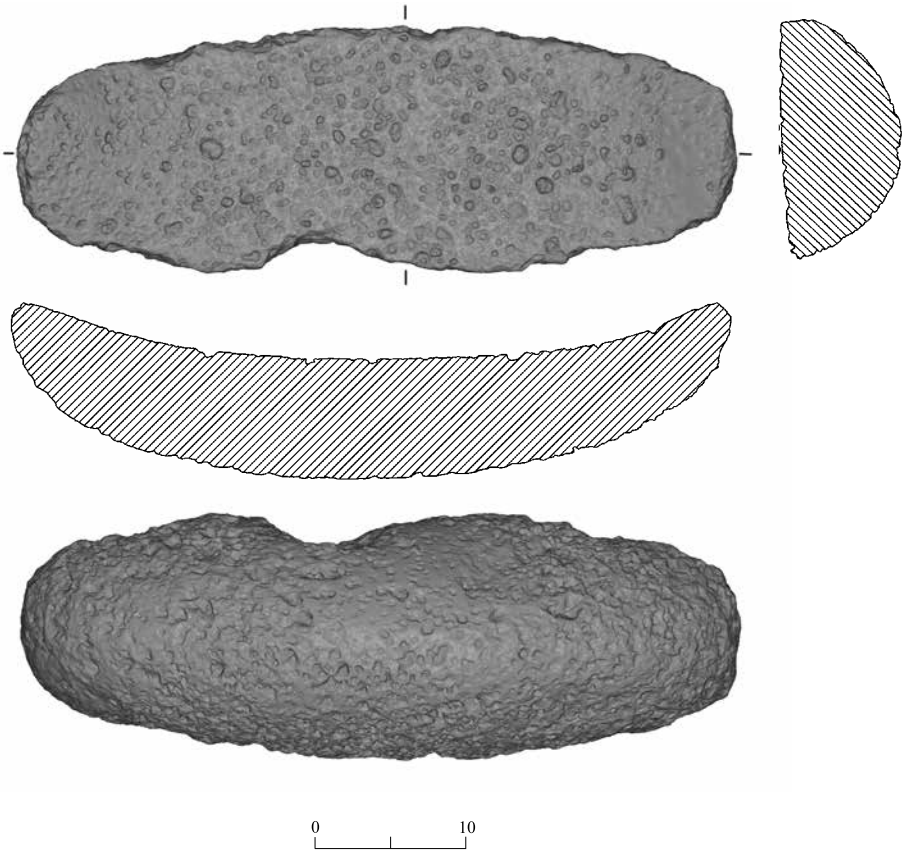

Fig. 2. Loaf-shaped upper grinding stone (MA9).

backs. Production scars, usually found on the circumference, are dominated by coarse chisel marks. The back in most of these items shows polish c. 5–10 cm from the edge. Similar patterns were noted in upper grinding stones dated to the Middle and Late Bronze Ages at Tel Bet She'an (Yahalom-Mack 2007: Table 11.5).

The small upper grinding stones (n = 4; MA24, MA27, MA28, MA29), all made of compact basalt, are either round (MA28, MA29) or oval (MA24, MA27). Round item MA28 (Fig. 3:1), 9 cm in diameter and 4 cm thick, has a biplano cross section and shows flake scars on c. 20% of its surface. Grinding stone MA29 (9 cm long, 8.5 cm wide, 3.5 cm thick; Fig. 3:2) bears a yellow sediment residue on c. 55% of its surface. The polished oval-shaped MA24 (3.5 cm thick) is broken and has a plano-convex cross section. The highly smoothed MA 27 (15 cm long, 4 cm thick at its center; Fig. 3:3) bears production and use marks. The four tools are damaged and have an average weight of 0.68 kg, suggesting a tool easy to operate with one hand.

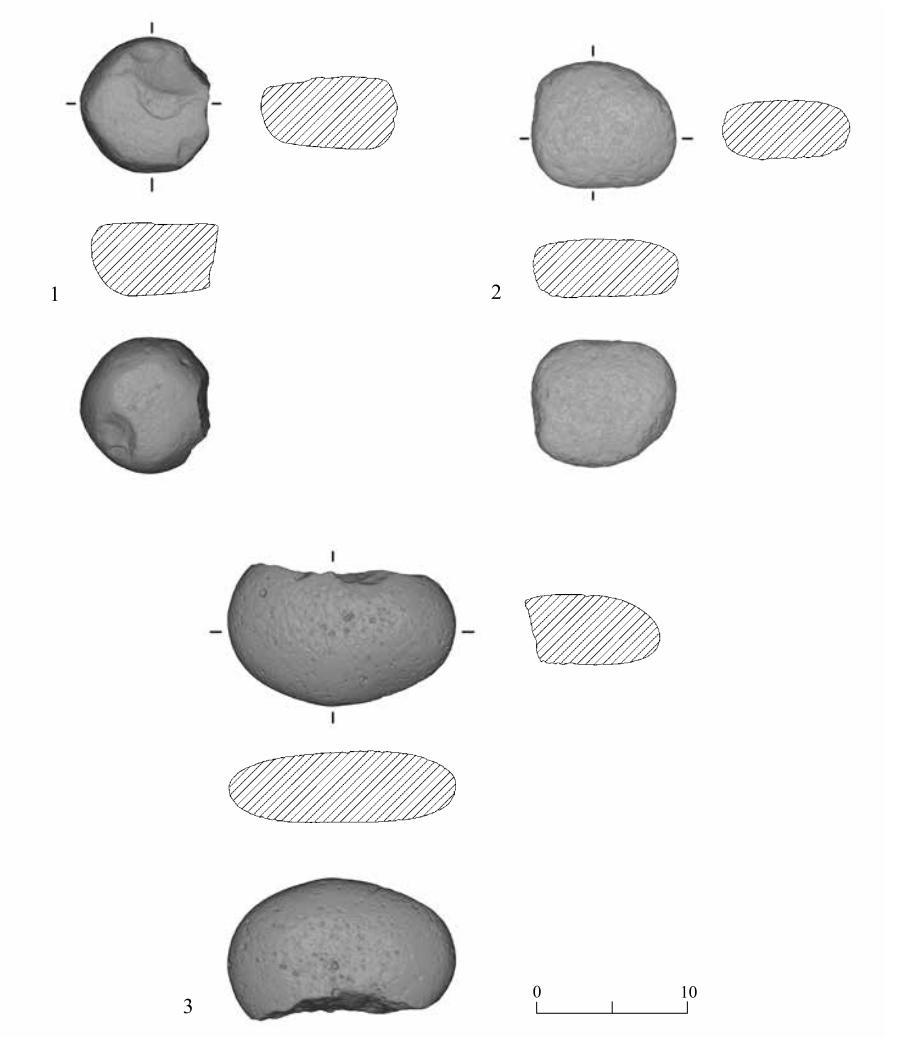

Fig. 3. Small upper grinding stones: (1, 2) rounded (MA28, MA29); (3) oval (MA27).

Pestles

Pestles are pounding implements, frequently operated as part of a set. In the present assemblage, the pestles (n = 4; M32–M35) make up 12.2% of the ground stone tools and are all made of compact basalt. Pestles MA32 and MA34 feature a red and yellow substance covering parts of their body, perhaps remains of ochre.

The 12 cm long conical/cylindrical MA32 (Fig. 4:1) has a maximum diameter of 5 cm and weighs 0.5 kg. Its active end is covered with battering marks; pecking, visible on some parts of this tool, is related to production rather than use. Occasional smoothing is also present, but may relate to use-wear and not to production. A yellow substance covers c. 70% of the tool's surface and a red substance is visible on about another 20% of the body. Pestle MA33 is broken, damaged on both ends. It may have been cubical (Yahalom-Mack 2007: Fig. 11.5), but this is hard to ascertain as it is too poorly preserved due to it being broken both crosswise and lengthwise.

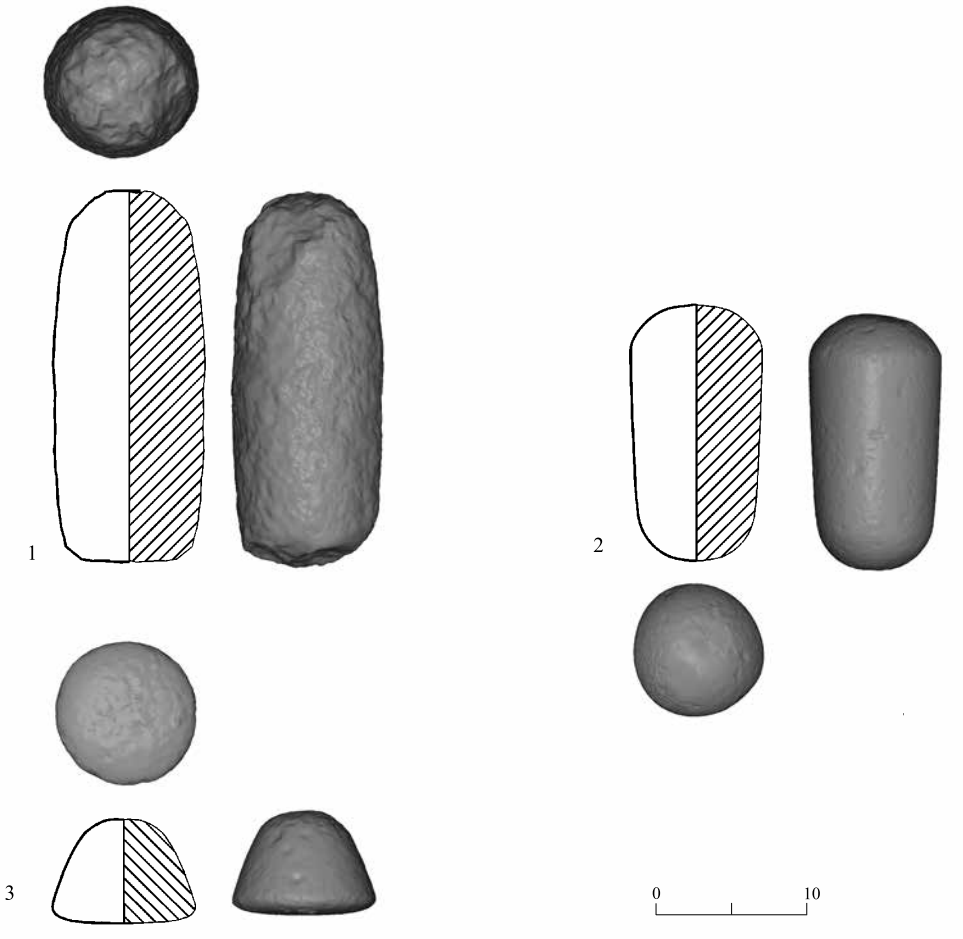

Fig. 4. Pestles: (1) conical (MA32); (2) cylinder (MA34); and dome (3) shaped (MA35).

Cylindrical MA34 (Fig. 4:2) is 8 cm long and weighs 270 g. It features smoothing marks, and its two active ends are covered with battering marks. The somewhat conical, or dome-shaped MA35 (Fig. 4:3) is 3 cm long and weighs 100 g. Its active end measures 4.5 cm in diameter and the oval top, 2.5 cm in diameter. The item features smoothing marks that reflect intentional modification of the original blank. The active end is smoothed and shows traces of a circular motion, such as crushing, and the edges of the active end are also slightly smoothed. Some battering and smoothing characterize the opposite end.

During the Middle and Late Bronze Ages, cylinder and conical/cylindrical pestles were often made of basalt (e.g., Milevski 1998:68–70; Webb 1998:796–805; Yahalom-Mack 2007:645–649; Yahalom-Mack and Panitz-Cohen 2009:725–728). At Tel Bet She'an, the average weight of the pestles (all types) is 307 g (Yahalom-Mack 2007:645), while in the current assemblage, it averages 285 g. Only one tool from each type (cylinder, conical/cylindrical) was preserved at el-Munṭar el-Abyad. The dome-shaped pestle (MA35) seems to reflect a more standardized production, with a fixed set of stylistic conventions, such as shape, size and weight.

Bowls and Mortars

The bowls and mortars in the assemblage (n = 4, 12.2%; MA39, MA41, MA42, MA47) comprise various subtypes. Mortar MA39 is complete and shallow (4 cm high, 4 cm thick, rim diam. 22 cm; Fig. 5:1), with a volume of 0.6 liters and weighing 4.6 kg. Smoothening is visible on its inside, yet it is unclear if this relates to production or use, although the latter is more likely.

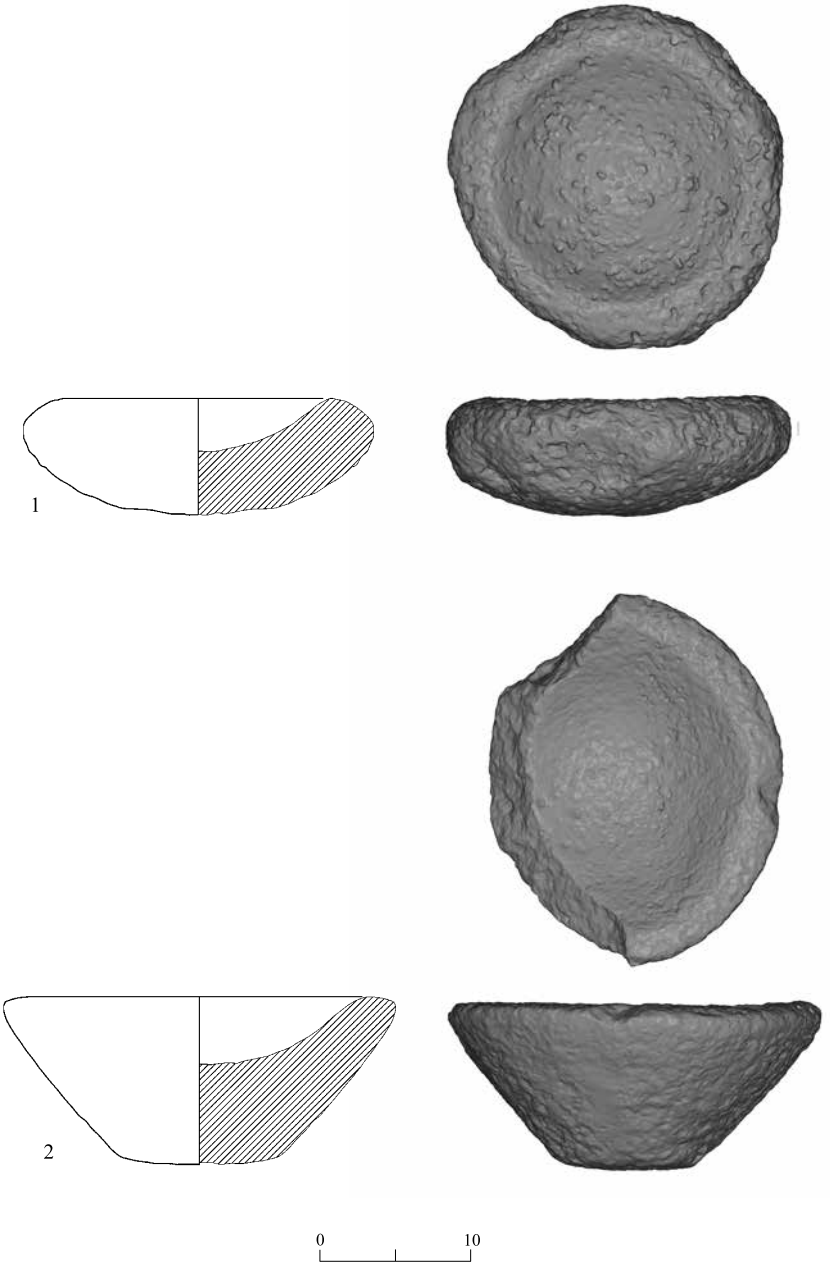

Fig. 5. Bowls: (1) shallow (MA39); (2) V-shaped (MA41).

V-shaped bowl MA41 (Fig. 5:2) is made of compact basalt, with a massive base (6 cm thick, base diam. 9 cm, 4.1 kg). As it is broken, the diameter near the rim could not be determined. Smoothing and polish marks are visible in its inner part, and its outer part shows a variety of production techniques that include pecking, chiseling and smoothing. The bowl was roughly finished.

Large shallow bowl MA42 (930 g; Fig. 6), made of compact basalt, is characterized by its thick base (diam. 7 cm). The bowl's top measures 9.5 cm in diameter. Smoothing and pecking marks are visible on the base, and the highly polished hollow interior may suggest its use for crushing. Similar items were found in the Middle and Late Bronze Age levels at Tel Bet She'an (Yahalom-Mack 2007:639–640; Yahlom-Mack and Panitz-Cohen 2009:722) and the Iron II levels at Ḥaẓor (Ebeling 2012: Fig. 11.6).

Mortar MA47 is massive (13.6 kg), made of vesicular basalt, mostly untouched, yet comprising two cup marks. The larger cupmark, not preserved, shows signs of smoothing. The smaller depression is not well-preserved, but its diameter is estimated at 6.6 cm. Chisel and polish marks were noted.

Weights

Three weights (MA36, MA37, MA48) were found at the site, but only one came from a secure context (MA37). This item is a poorly preserved perforated ring made of compact basalt. The shafts of all three items were drilled from both sides.

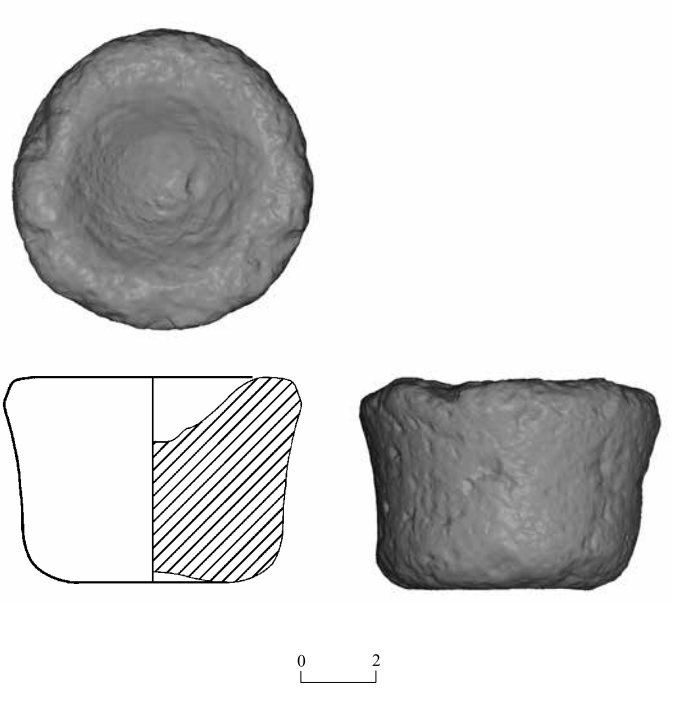

Fig. 6. Thick-based bowl (MA42).

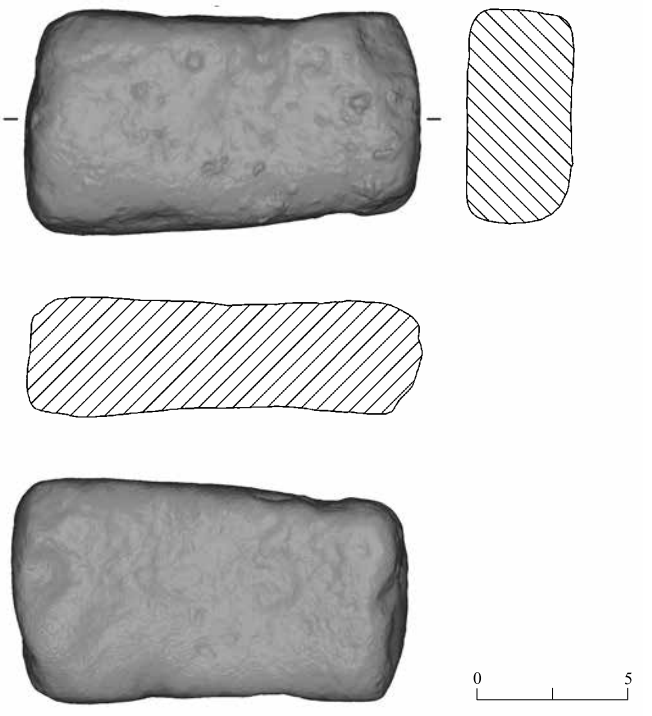

Fig. 7. A pallet (MA44).

Varia

Item MA44 is a rectangular sandstone pallet (Fig. 7), weighing 700 g and measuring 12.5 cm in length, with an average width of 7.75 cm and an average thickness of 3.4 cm. The rectangular shape of the tool and the slightly concave feature on one of its sides suggest a pallet. Use-wear includes smoothing to an almost polishing point. Pecking marks are also visible. A small flat marble fragment (MA45) was found in L1304, probably intrusive from the Roman cemetery.

DISCUSSION

The ground stone tool assemblage from the site is small, and the items found in secure contexts (n = 33) probably represent only a partial picture of the activities at the site. Most ground stone tools retrieved from secure MB IIB contexts were either found on floors or within the debris discovered upon surfaces (54.5%). Most tools are broken, and most are made of basalt (94% of the assemblage), almost equally divided between compact and vesicular variants. Many basalt sources can be found near the site.

A significant amount of these ground stone tools (n = 11) were found in Building Complex 1, one of the largest and best-preserved architectural units revealed in the excavation (see

Atrash and Golani, this volume: Plan 4). Among these, all the lower and upper grinding stones were found broken, contrasting with the majority of the other items, such as mortars, pestles and pallets, which were found complete. Four of these items, including two upper grinding stone fragments (MA20, MA21), a pestle (MA34), and a mortar (MA47), were recovered from Room A, the largest room of Building Complex 1; a lower grinding stone (MA19) was recovered from Room B; a pallet (MA44), from the main courtyard; an upper grinding stone (MA6), from a wall; a lower and an upper grinding stone (MA4, MA17), from Room F; and an upper grinding stone (MA24) and a pestle (MA33), from Room E. Although Building Complex 1 was the most fully excavated architectural unit, the fact that one-third of all the ground stone tools were directly associated with it serves to highlight further its importance in relation to the other excavated structures.

The assemblage (n = 33) as a whole is dominated by grinding tools (66.6%), while only four pestles and four bowls were found. The large number of grinding elements apparently points toward grain processing at the site. Both the upper and lower grinding tools reflect standardization in terms of raw-material selection and morphometric attributes, such as size, morphology and characterization of the active surface. The lower grinding stones are dominated by the saddle-shaped type, with two main subtypes: with a single grinding surface (n = 4; MA2–3, MA5 and MA26); and with two grinding surfaces (n = 2; MA4 and MA6), perhaps representing different wear stages of the operative surface. The lower grinding stones were found broken, and we should be cautious when interpreting their find-context.

The fact that most items in the assemblage were found broken is further indication that habitation at the MB II village ended as a result of an orderly and peaceful abandonment, with larger, portable items being taken only if complete.

Production marks are visible on most of the lower grinding stones, and they were clearly shaped into their final form through pecking. Of note is the angle by which the tools' ends tilt, a phenomenon noted also in other lower grinding stone assemblages, such as the Middle and Late Bronze Age levels at Tel Bet She'an (Yahalom-Mack 2007:639–660; Yahalom-Mack and Panitz-Cohen 2009:719–736), MB IIA levels at Yahud (Brink et al. 2014:131–174), the MB IIA strata at Ḥaẓor (Ebeling 2012:542–557), the Middle Bronze Age levels at Ebla (Peyronel and Spreafico 2008:213–223) and the Late Bronze Age strata at Tel Yin'am (Liebowitz 2008). Similar items were found in Late Bronze Age sites in Cyprus (e.g., Xenophontos; Elliott and Malpas 1988:169) and Jordan (LB–IA layers at Tell Deir 'Alla; Petit 1999:150–152).

The typological association of the loaf-shaped upper grinding stones has been controversial due to their somewhat massive nature. For example, Milevski (1998:64) defined the upper grinding stone as slightly shorter than the lower grinding stone. In his upper grinding-stone typology, he suggests that this was mostly held with both hands, had two working surfaces, and should be no more than 30 cm long (see also Webb 1998 for examples from Cyprus). Hovers (1996:171–192) claims that an upper grinding stone should have a flat or slightly concave working surface.

In the present assemblage, the upper grinding stones are shorter (45 cm) than the lower grinding stones (62 cm); however, the length of the upper grinding stones is greater, on average, than the width of the nearly complete lower grinding stone (27 cm). Thus, the assemblage seems to suggest that the length of the upper grinding stones may have been slightly greater than the width of the lower element, in this way protruding from both sides when set across the lower grinding stone and during the grinding motion. The average weight of the two complete tools in the present assemblage is 7 kg and their average length 45 cm. As for the other broken tools of this type, we can assume that, when whole, they were of similar weight and length. Also, in the present assemblage, the working surfaces of the loaf-shaped upper grinding stones are concave.

Loaf-shaped upper grinding stones are frequent in many assemblages, even in later periods. At Tel Bet She'an, there is clear evidence for the use of these items. A lower grinding slab with an upper loaf-shaped grinding stone placed on top was found *in situ* near a wall in a room in Building SM (Yahalom-Mack and Panitz-Cohen 2009: Fig. 14.6). The Tel Bet She'an upper grinding stones have an average length of 35 cm (taken from complete loaf-shaped tools, see Yahalom-Mack and Panitz-Cohen 2009: Table 14.3) and an average width of 10 cm. The el-Munṭar el-Abyad upper grinding tools are slightly larger, this difference perhaps reflecting local manufacture, functional variations, or stylistic demands. Similar items were also found in MB II Ebla (Peyronel and Spreafico 2008: Fig. 7) and in Late Bronze Age strata at Tel Yin'am (Liebowitz 2008:186–190). Wear polish seems to be frequent in the loaf-shaped upper grinding tools of el-Munṭar el-Abyad, apparently only on the edges of their back surfaces, which seems to fit nicely with the working position of the hands and representing use-wear stemming from the prolonged use of the tool.

Pestles (n = 4) represent a small but varied component in the assemblage, with the three defined types—conical, cylinder and dome-shaped—reflecting, perhaps, different functions. The bowls also comprise three types, namely a crude mortar, an unusual V-shaped bowl and a goblet.

In conclusion, the ground stone tool assemblage of el-Munṭar el-Abyad primarily reflects food processing, while implements associated with other activities (e.g., ochre processing) are rare. The choice of basalt as raw material is probably related to its availability near the site and the dominance of grinding tools. Evidence of morphological, metrical and stylistic standardization was found in some tools, possibly pointing to a single production workshop, probably located at Tel Bet She'an and similar to the one recently published from Iron Age Ḥaẓor (Ebeling and Rosenberg 2015).

CATALOGUE: THE GROUND STONE TOOL ASSEMBLAGE

Cat. No.	Tool Type	Locus	Basket	Raw Material	Preservation	Context	Fig.
MA1	Lower grinding stone	1416	14042	Vesicular basalt	Broken	Topsoil removal	
MA2	Lower grinding stone	1036	10086	Compact basalt	Broken	Debris around stones in alley	
MA3	Lower grinding stone	1131	11184	Vesicular basalt	Broken	Debris upon surface in open area	
MA4	Lower grinding stone	1141	11182	Vesicular basalt	Broken	Debris upon floor in Room F of Building Complex 1	1:2
MA5	Lower grinding stone	1413	14043	Compact basalt	Broken	Disturbed debris in open area	
MA6	Lower grinding stone	1140	11181	Compact basalt	Broken	Wall in Building Complex 1	
MA7	Lower grinding stone	1413	14044	Compact basalt	Broken	Disturbed debris in open area	
MA8	Upper grinding stone	1327	13082	Compact basalt	Complete	Topsoil removal	
MA9	Upper grinding stone	1146	11189	Vesicular basalt	Complete	Debris upon floor in Building Complex 6	2
MA10	Upper grinding stone	1301	13005	Compact basalt	Broken	Topsoil removal	
MA11	Upper grinding stone	1146	11186	Vesicular basalt	Nearly whole	Debris upon floor in Building Complex 6	
MA12	Upper grinding stone	1036	10085	Vesicular basalt	Broken	Debris around stones in alley	
MA13	Upper grinding stone	1146	11132	Vesicular basalt	Broken	Debris upon floor in Building Complex 6	
MA14	Upper grinding stone	1416	14041	Compact basalt	Broken	Topsoil removal	
MA15	Upper grinding stone	1206	12015	Compact basalt	Broken	Debris upon floor in Room B of Building Complex 4	
MA16	Upper grinding stone	1271	12169	Vesicular basalt	Broken	Topsoil removal	
MA17	Upper grinding stone	1141	11183	Vesicular basalt	Broken	Debris upon floor in Room F of Building Complex 1	
MA18	Upper grinding stone	1116	11044	Vesicular basalt	Broken	Surface makeup in alleyway	
MA19	Upper grinding stone	1262	12170	Vesicular basalt	Broken	Debris upon floor in Room B of Building Complex 1	
MA20	Upper grinding stone	1310	13096	Vesicular basalt	Broken	Wall of Room A in Building Complex 1	

Catalogue (cont.)

Cat. No.	Tool Type	Locus	Basket	Raw Material	Preservation	Context	Fig.
MA21	Upper grinding stone	1245	12167	Vesicular basalt	Broken	Debris upon floor in Room A of Building Complex 1	
MA22	Upper grinding stone	1029	10064	Vesicular basalt	Broken	Surface makeup and debris upon surface in open area	
MA23	Upper grinding stone	1325	13075	Vesicular basalt	Broken	Topsoil removal	
MA24	Upper grinding stone; small	1164	11172	Compact basalt	Broken	Debris upon surface in Room E of Building Complex 1	
MA25	Upper grinding stone	1330	13083	Vesicular basalt	Broken	Debris upon surface in open area of Structure 1	
MA26	Lower grinding stone	1309	13033	Vesicular basalt	Nearly whole	Topsoil removal	1:1
MA27	Upper grinding stone; small	1275	12160	Compact basalt	Broken	Debris upon surface and surface makeup in courtyard of Building Complex 3	3:3
MA28	Upper grinding stone; small	1146	11173	Compact basalt	Broken	Debris upon floor in Building Complex 6	3:1
MA29	Upper grinding stone; small	1275	12160	Compact basalt	Complete	Debris upon surface and surface makeup in courtyard of Building Complex 3	3:2
MA30	Upper grinding stone	1137	11123	Compact basalt	Complete	Topsoil removal	
MA31	Upper grinding stone	1163	11170	Compact basalt	Broken	Topsoil removal	
MA32	Pestle	1024	10055	Compact basalt	Complete	Debris upon surface and surface makeup in open area; remains of ochre(?)	4:1
MA33	Pestle	1164	11172	Compact basalt	Broken	Debris upon surface in Room E of Building Complex 1	
MA34	Pestle	1311	13081	Compact basalt	Complete	Debris upon floor in Room A of Building Complex 1; remains of ochre(?)	4:2
MA35	Pestle	1026	10079	Compact basalt	Broken	Surface makeup in courtyard of Building Complex 5	4:3

CATALOGUE (cont.)

Cat. No.	Tool Type	Locus	Basket	Raw Material	Preservation	Context	Fig.
MA36	Weight	1309	13028	Compact basalt	Broken	Topsoil removal	
MA37	Weight	1112	11029	Compact basalt	Broken	Debris in alley	
MA38	Bowl	1236	12096	Compact basalt	Broken	Topsoil removal	
MA39	Bowl	1248	12119	Vesicular basalt	Complete	Debris upon surface in Structure 1	5:1
MA40	Bowl	1236	12089	Vesicular basalt	Complete	Topsoil removal	
MA41	Bowl	1105	11026	Vesicular basalt	Broken	Mixed debris upon surface in open area	5:2
MA42	Bowl	1265	12166	Compact basalt	Broken	Debris on surface in open area	6
MA43	Bowl	1314	13048	Compact basalt	Broken	Topsoil removal	
MA44	Pallet	1159	11166	Sandstone	Complete	Debris upon surface in courtyard of Building Complex 1	7
MA45	Fragment	1304	13014	Marble	Broken	Debris upon floor in Room B of Building Complex 4	
MA46	Unknown	1255	12133	Flint?	Complete	Topsoil removal	
MA47	Mortar	1245	No data	Vesicular basalt	Complete	Debris upon floor in Room A of Building Complex 1	
MA48	Weight	Unknown	Unknown	Compact basalt	Broken	Unknown	

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