



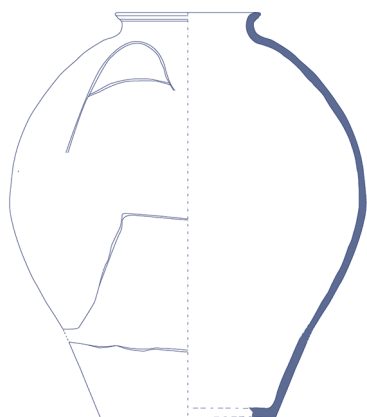
TELL TUQAN EXCAVATIONS AND REGIONAL PERSPECTIVES

CULTURAL DEVELOPMENTS IN INNER SYRIA
FROM THE EARLY BRONZE AGE
TO THE PERSIAN/HELLENISTIC PERIOD

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Garbage Disposal in the Middle Bronze Age in Tell Mardikh-Ebla (NW Syria): Using Plant Remains to Investigate Midden Formation Processes

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Introduction

In this study, we intend to explore the informative potential of discarded archaeobotanical remains well beyond the sphere of food strategies, and to outline the disposal behaviour patterns of a well-established Syrian city-state during the Middle Bronze Age.

The opportunity to conduct this kind of research arose from the discovery of a refuse dump full of charcoal, pottery and bones on the edge of the eastern rampart (Area EE) of the Ebla site during the 1999 field campaign.¹

New investigations (2004 and 2005 seasons) aimed at investigating disposal behaviours via the remains of discarded daily-life plants led to an assay (2 square metres) being conducted immediately south of the southern limit of Area EE. Stratigraphical investigations were carried out to ascertain the nature of the deposit.

The repetitiveness over time seen in the acts of discard suggested that we were dealing with a midden and not with a simple dump. Therefore an accurate analysis of plant material was carried out to determine the duration, frequency and manner of use of the midden.

Remains of charred wood (anthracoremaines) and seeds/fruits (carporemaines) were identified and the data were compared with those available for other contexts analysed from the site of Ebla. These observations identified the possible areas of origin of the dumped wood and seeds/fruits.

Inferences were also made regarding the time of discard, considering that plants are subject to a natural growth cycle and can thus theoretically provide indications regarding seasonal patterns of refuse dumping. In this study, storable plants were excluded from the discussion, because they were not considered reliable seasonal indicators.

¹ Peyronel 2008.

Discarding refuses: approaches and tendencies in the research.

The generation and accumulation of refuse have been an aspect of human existence ever since the appearance of the earliest hominids.² The informative potential of such deposits have been widely explored by ethnographers,³ anthropologists⁴ and archaeologists,⁵ who seek to identify waste disposal patterns and make appropriate inferences regarding the customs associated with them.

The debate originated in the 1970's when Schiffer pointed out that garbage was in many ways culture-specific because its composition differs from one society to another and thus reflects different cultural backgrounds.⁶

This does not mean that refuse deposits had not been investigated before this time. Indeed, in the late 19th and early 20th centuries, work had been carried out on refuse heaps in Ventnor⁷ and Chark.⁸ However, Schiffer was the first who attempted to classify the different categories of refuse, distinguishing between *primary refuse*, deposits made up of items intentionally discarded in their location of use at the end of their useful life, and *secondary refuse*, items dumped in areas other than where they were used. He also referred to *de facto refuse*, generated when cultural materials are abandoned within an activity area, although they are still usable.⁹

Scholars such as Hayden and Cannon,¹⁰ Deal¹¹ and Joyce and Johannessen¹² introduced the concept of *provisional discards* to indicate still usable items, stored in out-of-the-way places (e.g. storerooms) but not subsequently used.

So far, the investigation of refuse has been applied to nomadic as well as sedentary communities of the past and present, and special attention has been paid to the study of cultural material.¹³ The criterion for such studies has been that refuse '*should display some relationship to economic aspects of individual households as well as to practical concerns involving the use of space*'.¹⁴

Several researchers have also drawn conclusions on the disposal behaviour of past human communities from discarded ecofacts; bio-archaeological remains have been analysed to determine the duration of dumps and the manner

² Staski - Sutro (eds.) 1991: 3.

³ Binford 1983; Lange - Rydberg 1972.

⁴ Rathje 1992; Wilson 1994.

⁵ Falconer 1995; Martin - Russell 2000; Speth 2006.

⁶ Schiffer 1972; 1983.

⁷ Westropp 1878.

⁸ Cooke 1923.

⁹ Schiffer 1976: 3.

¹⁰ Hayden - Cannon 1983.

¹¹ Deal 1985.

¹² Joyce - Johannessen 1993.

¹³ Beck - Hill 2004; Hardy-Smith - Edwards 2004; McOmish 1996.

¹⁴ Hayden - Cannon 1983: 119.

in which they were used, including, where possible, seasonality in the patterns of discard.¹⁵

Specifically, discarded charred plant remains have been found to be highly useful in addressing subsistence economies in prehistoric agricultural societies¹⁶ and shedding light on food habits and attitudes towards luxury goods in pre-modern communities.¹⁷

The context of the study

The site of Ebla, above the modern village of Tell Mardikh, represents one of the most important urban-based systems in north-western Syria.¹⁸

Previous archaeobotanical analyses suggest the presence of no-longer present woodland resources: *Quercus-Pistacia* steppe forest to the east, Mediterranean forest to the west and orchards in the surroundings of the Tell.¹⁹

Systematic occupation of the site began in the Early Bronze Age and lasted until the late Middle Bronze Age.

The transition between the Early Bronze Age and Middle Bronze Age is marked by abrupt climate changes which struck the entire Near East around the second half of the 3rd millennium BC. In this period Ebla underwent a series of social and political upheavals which led to the disruption of the city around 2000 BC.

During the centuries which followed the Early-Middle Bronze Age transition, Ebla was reorganized, as shown by the western palace (Area Q) and the southern palace (Area FF), several temples (D, N, B, HH2), domestic quarters (Area B East) and luxury residences (Area Z).²⁰

The construction of the eastern rampart (Area EE), which was affected in subsequent decades by the creation of dumps for the disposal of the settlement's waste, has also been dated to this time (Fig. 1).

Preliminary investigations in 1999 did not determine the precise limits of the dump. The northern part was partially levelled and covered by a layer of packed bricks related to more recent archaeological evidence built directly over the dump. However, grey ashy earth found just to the south, near the surface in a slightly lower area outside the excavations suggests that it was approximately 30 m long and 20 m wide.

¹⁵ Bartosiewicz *et al.* 2010; Holmgren *et al.* 2001; McCorriston 1992; McNiven - Wright 2008; Rosendahl *et al.* 2007; Sawbridge - Bell 1972.

¹⁶ Begler - Keatinge 1979; Lennstrom - Hastorf 1995; Wright *et al.* 1989.

¹⁷ Bedini *et al.* 1990; Clark *et al.* 1989; Dupré Raventos - Remolà (eds.) 1996, Oliszewski 2005.

¹⁸ Matthiae *et al.* (edd.) 1995.

¹⁹ Caracuta - Fiorentino 2013.

²⁰ Matthiae 2010: 203; Mazzoni - Felli 2007.

In 1999, 30 m² of the refuse dump were uncovered and partially excavated to a depth of 1.6 m, without however reaching the bottom of the midden (Fig. 2).

Observations of the visible section exposed in 1999 led to the recognition of several layers of debris.

The multiple layers of ashes and burnt organic remains, together with potsherds and small objects, clearly represent the result of frequent dumping, since the pottery is absolutely homogeneous.

Absolute radiocarbon dating was performed on three plant samples collected from the exposed section. The calibrated results suggest that the visible portion of the deposit was formed between 2000 and 1900 BC, in agreement with the chronological range proposed on the basis of the pottery analysis.²¹

Material and methods

The stratigraphical pattern of archaeological deposits exposed in the 1999 excavation clarified the sequence of layers corresponding to discard-events. In order to determine the history of the refuse heap, in 2004 and 2005 new field campaigns were carried out.

Each layer within the 2 m² assay was sequentially removed, noting the changes in the colour and texture of the soil and the composition of the layer itself (e.g. pottery, bones and ashes).

During the digging, artefacts were separated from the rest of the material and soil samples were wet-sieved using a mesh of 1 and 0.5 mm to separate bio-archaeological remains from the soil matrix.

Charred plant remains were stored separately from fauna. The seeds/fruits and wood tissue were sorted and analysed at Laboratorio di Archeobotanica e Paleoecologia of Università del Salento.

The morphometric traits of the carporemaines were analysed using a stereomicroscope (Nikon SMZ745T), while the microscopic features of the anthracoremaines were investigated by means of a metallographic microscope (Nikon TS2159).

Charred plants were identified by comparing the archaeo-botanical remains with modern reference material collected in Syria, and taxonomical atlases.²²

Results

Stratigraphical analyses

During the 2004-05 campaign, only the first seven Stratigraphic Units (SU) recognized in the cross section exposed in 1999 were removed.

²¹ Peyronel *in press*.

²² Akkemik - Yaman 2012; Fahn *et al.* 1990; Greguss 1955; Schweingruber 1990.

The oldest sheet-like SUs (7-6-4 and 3) were made up of grey-ashy sediment on the top and reddish-brown baked clay on the bottom. These deposits also contained stones with evident traces of thermal alteration.

The overall pattern that emerged from observation of the macro-physical features of the sheet-like SUs suggested that fires had been lit in the dump at various intervals.

Sheet-layer 1, which lay atop SUs 7-6-4 and 3, was made up of dark soil with no traces of thermal alteration and little archaeological evidence. It was therefore interpreted as a layer derived from a natural depositional event.

Cutting through all the sheet-like layers (7-6-4-3 and 1) were two refuse pits (SUs 2 and 5). Pit "2", rich in pottery fragments, animal and plant remains, was located in the SW corner of the excavated area. It was identified as the most recent depositional event because it cut through the upper midden layers.

Another large pit (SU 5), cutting through the same sheet-like layers, was located on the NE edge of the assay. It was filled with brownish sandy sediment, rich in clay-oven (*tannûr*) remains and pottery fragments, animal bones, charcoals and charred seeds. This pit, which cut through layers 4-6-7, was not visible in the exposed cross-section (Figs. 3-4).

The archaeobotanical data

Of the 182.5 litres of wet-sieved sediment, a sub-sample of 20% (about 34.5 litres) was used for archaeobotanical analyses.

In total, 1,515 remains were sorted: 854 seeds/fruits (carporemaines) and 661 wood tissue fragments (anthracoremaines).

Layer 1 is characterized by the lowest frequency of remains, as expected from a deposit formed by natural agents.

The pits (SUs 2 and 5) yielded a greater number and variety of findings than the sheet-like layers, albeit in a lower density.

Layers 7-6-4-3 showed the highest concentration of findings, in agreement with the assumption that they were residues of hearths (Figs. 4-5).

The anthracological assemblage showed broad taxonomical variability, and the analysis of charred woody tissue identified at least thirteen different species.

The refuse dump had a large amount of olive wood (*Olea europaea*), but a good deal of fruit-trees such as wild-cherry (*Prunus* cf. *avium*) and pistachio (*Pistacia vera*) were also attested. Several types of oak, both semi-deciduous (*Quercus ithaburensis*) and evergreen (*Q. calliprinos*), were found together with deciduous oak and other *Pistacia* species (*P. atlantica/khinjuk*, *P. palaestina*) as well as a few fragments of buckthorn (*Rhamnus/Phillyrea*), pine (*Pinus* sp.) and undetermined Leguminosae and Ulmaceae (Fig. 5).

The carpological assemblage was mostly made up of cereals and weeds, with legumes and fruits representing only a small proportion of the finds.

Of the cereals, barley, both the six-row type (*Hordeum vulgare*) and the two-row type (*Hordeum vulgare subsp. distichum*), was the most ubiquitous,

while naked wheat (*Triticum aestivum/compactum*) was relatively less frequent.

Hulled wheat, such as einkorn (*Triticum monococcum*) and emmer (*Triticum dicoccum*), were attested in small quantities, as well as wild barley (*Hordeum spontaneum*).

Several caryopses were found in a partially germinated state or crushed in a non-physiological way. In addition, traces of bubble-like explosions were found on their surface. Weeds were well represented: *Polygonum* sp. and *Cyperus* sp. made up a good proportion of the carporemaines, while *Galium* sp., *Chenopodium* sp. and *Silene* sp. were rarely recorded.

Olive stones (*Olea europaea*) were common, while grape pips (*Vitis vinifera*) and what resembled a whitebeam stone (cf. *Sorbus* sp.) were limited to a few remains.

Small fragments of indeterminate legumes, lentils (*Lens* sp.) and bitter-vetch (*Vicia* cf. *ervilia*) also occurred in some layers (Fig. 6).

Discussion

Radiocarbon dating, coupled with stratigraphical analysis, suggests that the refuse dump of Area EE is a 'midden', understood as an accumulation of waste resulting from '*...deliberate and persistent acts over a period of time*'.²³

The radiocarbon analyses ascribed the period of accumulation to 2000-1900 BC, while the stratigraphical investigations suggest that the refuse contained in the 2 m² assay was discarded in at least seven distinct moments.

The anthrac- and carporemaines contained in the midden provide an opportunity to investigate the "midden catchments", defined by Boone as '*...the settlement area that encompasses all the refuse generative-activities...*'.²⁴

Previous studies had interpreted a midden as a mixture of secondary deposits of ashes of domestic origin.²⁵ However, this hypothesis is in contrast with the evidence of burnt residues in the Ebla midden layers which derive from hearth practices *in situ* that entailed burning a good quantity amount of local weeds (see sheet-like layers 3-4-6 and 7).

Assuming the waste is of domestic origin, comparison with the evidence from the Area B East residential quarter is necessary. Other data collected in private and public contexts, such as the nobleman's house in Area Z, the ritual well that marked the abandonment of Temple HH4-5 and the royal palaces FF and Q, should also be considered in order to define the patterns by which vegetal elements may have entered the midden during the Middle Bronze Age.

²³ Needham - Spence 1997; Schiffer 1987: 131, 234.

²⁴ Boone 1987: 336.

²⁵ Mc Corrison - Weisberg 2002.

The possibility that the remains found in the refuse dump may not come directly from these particular contexts was taken into account; the waste could have originated from other households or palaces that have yet to be investigated. Nonetheless, analysing plant remains in *primary deposition*, i.e. material discarded or burned in the location of use, provides us with an interpretative tool that may be improved by future analyses.

Midden catchment: the in-site provenience of plant remains

Anthracoremains

Whether discarded wood elements derive from households or public buildings depends on several factors and can only be discerned given an understanding of the rather complex cultural patterns of use and re-use of wood.

The archaeological contextualization of charred wood samples made it possible to identify the functions of each species (e.g. construction, furniture, fuel) and, consequently, to outline the different modes of arrival of the plant material in the midden.

The analysis of charcoal remains from the households of the B East quarter provided information about the species selected for domestic carpentry and oven fuel.

Several poles of olive wood were found on the floors of dwellings and the storeroom, showing that this type of wood was preferred for carpentry. However, archaeological and stratigraphical observations suggest that olive branches were also used as fuel in ovens (the so-called *tannûrs*), where they were found mixed together with wild cherry.

Analyses of the anthracological *spectrum* revealed that wild cherry was used for furniture too, as in the charred poles and residues of a cabinet on the floor of a household in Area B East²⁶ (Fig. 7).

Wild cherry was also held in great esteem as a luxury material, as suggested by the attestations of this taxon in the palatine residence in Area FF.

Despite the large quantities of wild cherry remains, it was not the most frequently used species in luxury housing, and considering it was found scattered in small fragments on the floor, it was probably used for furniture rather than construction.

Taxonomical analysis of the beams and poles in the Western Palace in Area Q showed that pine was the preferred species for luxury construction. The intrinsic hardness of such wood meant it was preferred for construction in modest households too, as testified by the findings of pine poles in dwellings and storerooms.

²⁶ Fiorentino - Caracuta 2013.

Of the taxa attested in the midden, olive, pine and wild cherry were the only wood types whose function can be identified on the basis of archaeological and anthracological comparison.

Oaks and *Pistacia* species were not recorded elsewhere, except the ritual well of Temple Area HH4-5, so the area and/or the activities which generated such waste remain unknown (Fig. 8).

To summarise, the wood material discarded in the midden may originate from a variety of contexts, and can thus be seen as ‘...an aggregate of the range of the activities that exposed plants to hearths fire on the site’.²⁷

Olive is the only species which was definitely used as fuel, while wild cherry and pine could have been discarded after the collapse of dwellings or storerooms. It is possible that wild cherry from the timbers of demolished buildings or from discarded furniture may have been burned in a *tannûr* before being dumped, following a system of reuse and recycling that was very common in pre-modern societies.²⁸

On the basis of the available information, the origin of the oak and *Pistacia* sp. wood in the midden could be explained by hypothesizing that a ritual well was emptied and the material dumped in the midden. However, if that were the case, then the remains of ritual cultural material, such as miniaturized pots and clay idols, would also have been found, but this was not the case (Fig. 9).²⁹

Charred seeds and fruits

Analysis of seeds and fruits in middens is a common means of studying food discard patterns and hence food consumption patterns.³⁰ Nevertheless, the correlation between refuse deposits and the ‘generative activities’ that produced the refuse is often not straightforward. Many ethno-archaeologists have studied this issue and observations of on-going societies show that no food remains are intentionally discarded.³¹

Such an assumption implies that carporemaines in middens entered the deposits due to accidental factors that rendered them unsuitable for consumption.

The study of the carpological assemblage highlighted differences between the material discarded in pits and that of the sheet-like layers. While cereals and edible annual fruits dominated the former, weeds were the most frequent in the latter.

Large quantities of barley and naked wheat were stored in a storeroom in the B East domestic quarter and they probably constituted the staples of the Ebla community’s diet.³²

²⁷ Mc Corrison 1992: 320.

²⁸ Kamp 1993.

²⁹ Peyronel *in press*.

³⁰ Bear 1991.

³¹ Kamp 1991.

³² Fiorentino *et al.* 2012.

Cereals were also attested on the floor of a dwelling, together with vetch and a few olive stones, grape pips and grape *acini*. Some remains of olive stones were found at the bottom of various *tannûrs* together with fragments of an undetermined legume.

The role of these species in the local diet is confirmed by the discovery of a good deal of barley, naked wheat, olives, grapes and various legumes in the ritual well of temple HH4-5³³ (Fig. 10).

The carpological assemblage of the pits may reflect floor sweepings and material resulting from the cleaning of *tannûrs* in domestic quarters, but it may also include residues of stored food.

The carcoremains found in the sheet-like layers may have had a different origin however. Here the few edible annual fruits were mixed together with weeds belonging to the local soil seed-bank. One possible explanation could be that 'domestic' refuse was discarded in the midden and then burned using brushwood from wild plants; evidence for this is provided by the thermal alteration that characterizes the soil matrix of the sheet-like layers.

Frequency and seasonality of midden use

The range of data that can be extracted from analyses of charred wood and seeds/fruits is probably one of the most underdeveloped and potentially significant methodological resources in archaeology, especially regarding the time of a deposit's formation.

Being part of the cycle of natural life, plants grow and flourish in accordance with a seasonal pattern that can be used to determine the time of arrival of plant remains in the midden.

Caution is needed however, since storage of edible annual fruits makes them available over long periods of time and thus reduces their value as seasonal indicators.

Short-lived branches of deciduous wood, less than two years old, are more reliable because the time of pruning can be inferred from the position of the bark. Bark after the early wood indicates that pruning occurred in spring-summer, whereas bark after the late wood indicates autumn-winter pruning.

However, the time of pruning may precede the final discarding by some margin, since pruned branches could have been used as fuel and then provisionally discarded before being dumped in the midden. Branches can also be gathered during the pruning season, stored for a while and then used months later.

Addressing seasonality using plant remains can be very problematic and each attempt needs to be carefully supported by other considerations. As far as the Ebla midden is concerned, the most reliable seasonal indicators were the weeds found in the sheet-like layers, because they entered the deposit as a result of burning local shrubs.

³³ Fiorentino - Caracuta 2010.

Polygonum sp., *Galium* sp. and *Cyperus* sp. flourish during spring-summer, so their presence in the sheet-like layers suggests that these deposits were buried in this period of the year. Some short-lived branches of *Pistacia vera*, found in layer 7, also seem to have been cut in spring-summer, as is shown by the presence of early wood under the bark.

More challenging was the case of the pits, which had the highest concentration of storable fruits. Species such as olive, grape and bitter-vetch are autumnal crops, while cereals are harvested in spring-summer, so none of them could be used to accurately infer the season of discard. The presence of short-lived branches of deciduous oak with the bark after the late wood (autumnal cut) did not add any information and did not prove that the remains were dumped during autumn-winter.

Conclusion

The study of plant remains found in the midden of the eastern rampart (Area EE) of Ebla helps to interpret the disposal behaviour associated with the discarding of ecofacts in one of the most highly developed sites of the Near East.

The analyses reveal that the inhabitants of Ebla not only produced waste but also decided how to dispose of it. In doing so, they followed a pattern which varied over time and from one situation to another but was never the work of single individuals, who would have simply deposited the refuse near their dwellings.³⁴ In Ebla this did not happen, suggesting that the whole process was regulated and controlled by the central power, which ordered all refuse to be dumped in the same place.

As the radiocarbon dating made clear, the refuse deposit contained in the assay was formed over a 100-year period from 2000 to 1900 BC. Stratigraphical observations enabled the deposits to be divided into several stratigraphical units, each representing a 'depositional event'.

Only seven units were actually sampled, revealing a varying pattern of refuse disposal. Two internal refuse pits filled with charred material cut through the oldest sheet-like layers, which were formed by burning material *in situ*.

The collection, counting and identification of charred plant remains, provided information on the discarded archaeobotanical assemblage, but it was only by comparison with data from other contexts that the set of cultural factors responsible for the formation of the deposit could be determined.

Different modes of arrival of plant material in the midden were identified and hypotheses concerning the range of activities that generated the archaeobotanical assemblage were made.

³⁴ Schiffer 1976.

The presence in midden layers of carporemaines might be due to *primary* activities such as food processing, which produced material that may have fallen on the floor and was then swept, stored in a provisional discard and subsequently dumped in the midden. Alternatively it may be due to *secondary* activities, which produced charred material as result of the cleaning of storerooms or cooking structures (*tannûrs*).

Fresh material was burnt *in situ* together with local seeds from the soil seed bank, as seen in the sheet-like layers, while material already burnt elsewhere was dumped in pits dug into the existing midden where they formed secondary deposits.

The anthracological assemblage originates from two types of activities: pruning and the use of uncultivated plants for various purposes, both of which eventually produce refuse to be burned.

Intuitively, it appears unlikely that fresh material was deliberately burned *after* being discarded, since it could have been used as fuel in the *tannûrs*. However, the thermal alteration of the soil seen in the sheet-like layers indicates high temperatures that could only result from substantial bonfires, which may have been used as a way of effectively eliminating rotting material. Thus the possibility that fresh wood was thrown into the midden and burned subsequently cannot be excluded.

Species such as wild cherry and pine may have been used first in construction and furniture and subsequently, once discarded, burnt as fuel in *tannûrs*. Once carbonised, this material was dumped in pits, entering the midden as a secondary deposit.

Considering the natural life cycle of plants, their remains might be assumed to mark their time of deposition, in accordance with a cyclical pattern.³⁵ This is certainly true for refuse produced by hunter-gatherer communities but the situation is less straightforward for urban communities, where the complex system of gathering and redistribution of foodstuffs means that edible seeds/fruits are available for longer periods, and their potential as seasonal indicators is significantly reduced. Non-edible fruits such as weeds are more reliable because they were not meant to be stored and their presence, at least in the midden of Area EE, was likely due to the burning of fresh material. Therefore, the presence of spring-summer weeds in the sheet-like layers suggests that the discarding and burning were carried out on a seasonal basis.

The traceability of refuse is a new way in which charred remains can be used in archaeology. A major challenge still persists when studying discarded vegetal elements however, and it is up to the archaeobotanist to make the appropriate inferences with reference to the cultural context, verifying the extent to which cultural characteristics are reflected in the pattern of plant

³⁵ Begler - Keatinge 1979.

refuse.³⁶ However, the precise set of vegetal materials which actually constitutes refuse in the Ebla site depends on patterns of human behaviour that are far from straightforward.

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³⁶ Stasky - Sutro (eds.) 1991.

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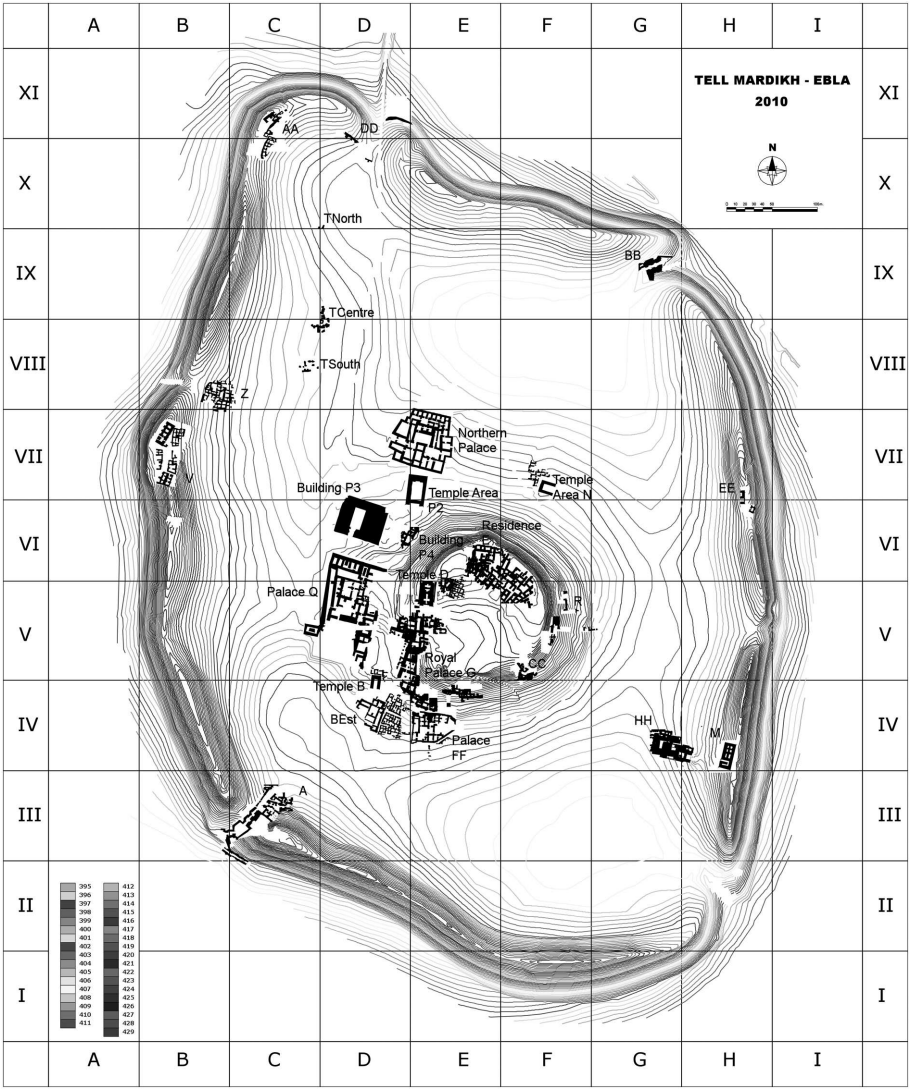


Fig. 1. Ebla topographic map.

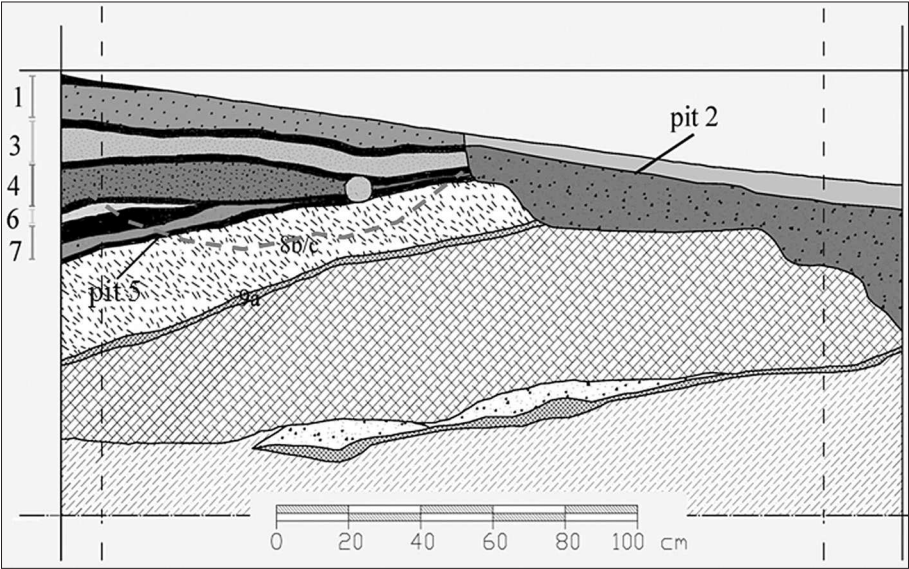


Fig. 3. Midden cross-section as exposed by 1999 excavation. (Drawn by Dr. Claudia Minniti)

US	Type of sediment	Archaeological interpretation
1	dark soil.	natural soil
2	sandy ruddy sediment	refuse pit
3	grey-ashy sediment + reddish-brown baked-clay soil	fireplace
4	“	“
5	sandy ruddy sediment	refuse pit
6	grey-ashy sediment + reddish-brown baked-clay soil	fireplace
7	“	“

Fig. 4. List of SUs with description of their physical properties and archaeological interpretation.

SU	Wood species															Volume (Lt)	Density (n° fragments/Lt)
	<i>Pinus</i> sp.	<i>Olea europaea</i>	Leguminosae	<i>Pistacia atlantica/hinjuik</i>	<i>Pistacia cf. palaestina</i>	<i>Pistacia cf. vera</i>	Pomoideae	<i>Prunus cf. avium</i>	<i>Quercus cf. calliprinos</i>	<i>Quercus deciduos</i> type	<i>Quercus cf. ithaburensis</i>	<i>Rhamnus/Phillyrea</i>	Ulmaceae	Unidentified	Total		
1	0	0	0	0	2	1	3	2	0	0	0	0	0	0	8	3,3	2,42
2	0	20	0	6	0	0	0	6	1	0	6	0	0	0	39	12	3,25
3	0	29	0	2	0	11	0	5	7	11	9	0	2	5	81	5	16,2
4	0	10	0	1	0	5	0	28	11	16	1	0	2	4	78	4,5	17,3
5	0	19	0	10	10	8	0	7	20	20	22	0	2	0	118	8	14,75
6	0	87	5	15	7	0	1	20	15	12	12	0	1	2	177	0,8	221,25
7	1	49	0	0	0	18	1	13	9	12	7	1	0	15	126	1	126
Total	1	214	5	34	19	43	5	81	63	71	57	1	7	26	627	34,6	

Fig. 5. Wood species found in the stratigraphical units (SU) of the midden EE. The volume of sediments analysed for the archaeobotanical analysis is reported together with the relative density of charcoal (fragments/litre).

SU	Cereals								Fruits			Legumes			Weeds						Volume (Lt)	Density (n° fragments/Lt)
	<i>Hordeum vulgare</i>	<i>H. spontaneum</i>	<i>H. vulgare</i> spp. <i>distichum</i>	<i>Triticum</i> sp.	<i>T. aestivum/compactum</i>	<i>T. dicoccum</i>	<i>T. monococcum</i>	<i>Triticum/Hordeum</i>	<i>Olea europaea</i>	<i>Vitis vinifera</i>	cf. <i>Sorbus</i>	<i>Lens</i> sp.	<i>Vicia ervilia</i>	Leguminosae	<i>Galium</i> sp.	<i>Polygonum</i> sp.	<i>Cyperus</i> sp.	<i>Chenopodium</i> sp.	<i>Silene</i> sp.	Total		
1	3	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	6	3,3	1,81
2	70	4	11	7	27	7	5	25	33	2	1	0	4	4	2	0	0	0	1	203	12	16,9
3	7	0	2	4	0	3	3	8	1	2	0	0	0	0	1	8	1	0	0	40	5	8
4	7	0	3	1	3	0	0	21		8	0	0	0	0	0	44	18	0	0	105	7	15
5	84	1	10	12	11	4	3	73	45	6	1	4	3	5	6	3	3	3	0	277	5,4	51,3
6	1	0	0	1	0	0	1	12	0	0	0	0	1	1	0	33	6	0	0	56	0,8	70
7	13	5	6	1	4	3	2	2	0	2	2	0	0	0	1	95	31	0	0	167	1	167
Total	185	10	32	26	46	17	14	141	80	20	4	4	8	11	10	183	59	3	1	854	34,5	

Fig. 6. Seed species found in the stratigraphical units (SU) of the midden EE. The volume of sediments analysed for the archaeobotanical analysis is reported together with the relative density of charcoal (fragments/litre).



Fig. 7. Area B East: L.8454 where remains of furniture were found on floor of room with *tannûr* T.8662.

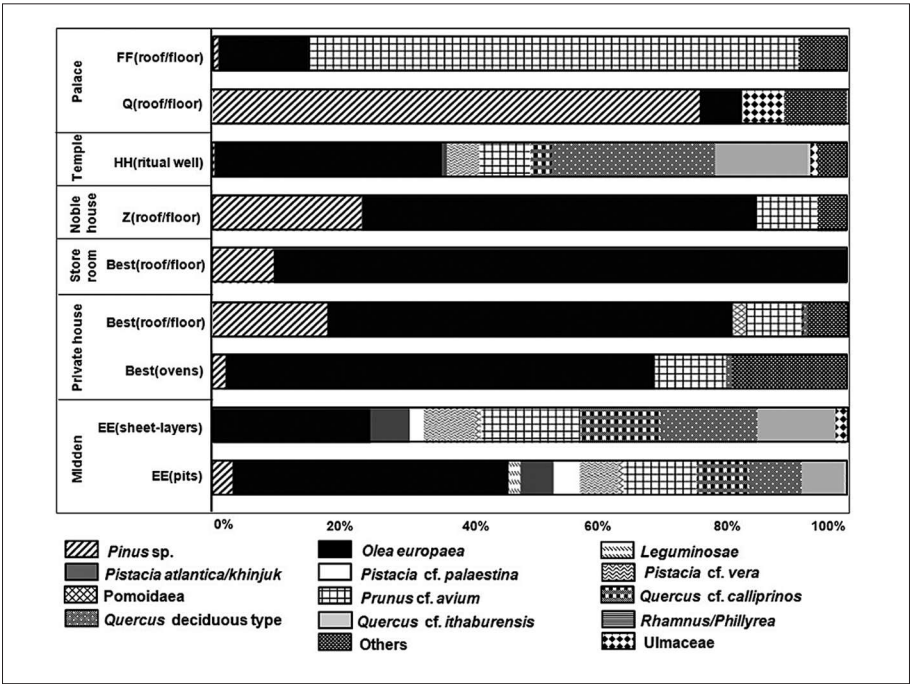


Fig. 8. Relative composition of anthracore remains found in MBA contexts.

