Charred Plant Remains

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INTRODUCTION

The excavations at Zeugma in 2000 afforded the opportunity to investigate the plant remains from this important site.[1] The archaeobotanical work at Zeugma is exceptionally rare in its examination of Roman urban contexts in the Near East. While there is a growing corpus of data from material evidence on Roman diet and economy in Europe and Africa, there is nothing comparable from this region. The aim of the analysis, therefore, was to recover as much information as possible that might relate to the following themes of investigation:

- dietary diversity
- trade in foodstuffs
- local and regional cultivation
- areas of specific activity within the city
- garden plants
- ritual deposition of plant remains
- variations in diet over time

METHODOLOGY

Sampling and Recovery

Bulk soil samples were taken during the excavations for the recovery of charred plant remains and charcoal. The sampling strategy was comprehensive, and efforts were made to ensure that all representative layers, feature types, and phases were sampled. In practice, a large number of the samples came from destruction layers, some of which were clearly rich in charred plant remains because the destruction was caused by the catastrophic event of a fire, but floor surfaces and drain and vessel fills were also well sampled. The samples were then processed on site by flotation in a modified Siraf-type machine, with sample sizes ranging from 1 to 40 liters in volume. The variation in the sample sizes depended upon the extent of the deposit and the richness of the charred material. A fine mesh cloth, with apertures not larger than 300 μm in size, was used for the collection of the flot, and the heavy residues were sorted to 0.5 mm for bones, artifacts, and any nonfloated plant material, although this was rare.

An assessment of 177 samples was carried out to determine the preservation and potential for analysis and 80 were selected for further analysis. Seven of these consisted of charred plant material that was hand retrieved during excavation, and these do not provide an accurate picture of the plant contents of the deposit as a whole. The samples were selected for analysis on the basis that they were either very rich in charred material or contained unusual remains (of which there were 35 samples), were from secure contexts, and would provide information relating to the aims of the analysis.

Sorting and Identification

Most of the 80 flots measuring 200 ml or less were sorted in their entirety. A few large samples measuring more than 200 ml had to be subsampled in order to use the time to study them in detail. These samples were split using a riffle box and a varying proportion, ranging from 12.5 to 50 percent, was analyzed.

The flots were sorted under a low-power binocular microscope after putting them through a nest of sieves to aid sorting. The finer fraction was sometimes so rich or large that it had to be divided, and 50 percent were fully sorted. The numbers of sorted and identified items were later multiplied up to the whole sample in order to make the calculations of the density of material (numbers of items per liter). The sorted items were identified at a magnification of up to 50×, and were compared using the reference collection of the British Institute of Archaeology in Ankara, where some of the material was taken.

Tables 1 and 3–10 present all plant remains from the excavations, the volumes of soil samples and flots, and the proportions analyzed. The nomenclature for everything and the order for the weed seeds follows the *Flora of Turkey*.[2] Plants have been divided in the tables into two main groups: cereals and food plants, and fruits and pulses.

Counts

The numbers in the tables represent whole single items. The numbers of fragments are expressed as whole items and entered in square brackets. These whole numbers have been used in the calculations. Fragments of cereal grains have not usually been counted, but the whole-grains equivalent has been reached by counting the embryos and the apices and entering the higher count of the two in the table in square brackets. Pomegranate calyx tubes were counted to give equivalent whole fruits. Other fragments, such as walnuts, olives, and some cereal grains, have been weighed and that weight compared with that of whole items, with the equivalent whole items entered in square brackets.

RESULTS

The results from the charred-plant analysis are presented by trench in tables 3–10 (pp. 420–32). A table of ubiquity showing the number of samples in each trench in which some of the main items of plant food are present has also been prepared (table 1).

Identifications

Wheat

Two types of wheat appear to be present in the samples. They are mainly represented by their grains with very little chaff present. The differentiation of the grains was difficult as they were mixed together in the samples. Free-threshing wheat could in some cases be safely identified where there were typical forms with broad, rounded, low back characters. Other well-preserved grains were more difficult to tell apart. We know from the presence of badly preserved chaff that hulled wheat was present, and this is thought to be *Triticum dicoccon* from the rare spikelet forks found. *T. spelta* appears to be absent; its chaff is usually very recognizable even when badly preserved. All the remaining grains were the same size and fairly plump, looking like free-threshing grains; however, some were slightly higher backed and some had more pointed apices and embryo ends; some of these may have been *T. dicoccon* but were not identified as such in the tables because they did not offer all the characteristics of emmer together on the same grains. This category, *Triticum* sp., in the table is likely to be composed of both glume wheat grains and free-threshing ones. It is thought that the free-threshing grains represent bread wheat, *T. aestivum,* because one hexaploid internode was retrieved, but it is of course difficult to generalize from one such rachis internode. The possibility that tetraploid wheat may have been present cannot be excluded.[3]

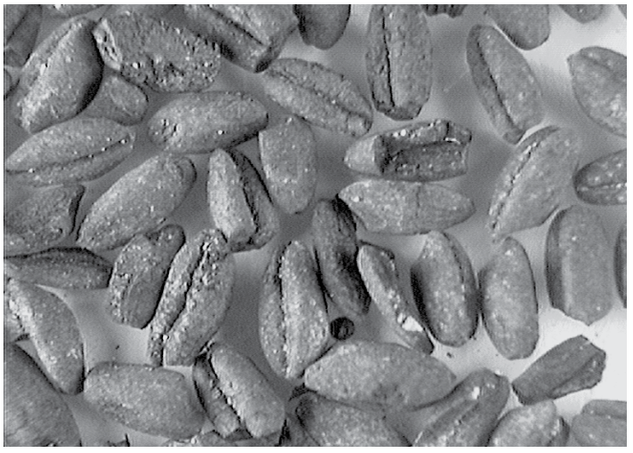

Figure 1. Photograph of Triticum sp. *grains from Trench 2.*

Barley

Hordeum vulgare was less common than wheat in the assemblages. Most barley grains were straight, and it is therefore thought that two-row barley was present throughout. It was found in fairly small amounts in nine of the samples and was slightly more abundant in three samples of Trench 13.

Olives

Olea europea was very frequent and sometimes abundant. Olives were present in 12 of the 18 samples of Trench 2, all the samples of Trench 7, 3 of the 6 of Trench 9, 7 of the 10 of Trench 13, all but 1 of Trench 15, 6 of the 9 samples of Trench 18. Overall they were found in 80 percent of the samples. The stones seem to fall into two groups: large and small, and were initially classified as type 1 and type 2, respectively. Of the two types of stone, 134 specimens were measured: the range of sizes of type 1 was 1.5 × 0.6 cm to 0.6 × 0.5 cm, the most typical measurements being around 1.1 × 0.5 cm. Type 2, the smaller ones, ranged from 0.6 × 0.5 cm to 0.1 × 0.1, with typical measurements of 0.5 to 0.35 × 0.32. The separation by eye of the two types was, however, not accurate, and the measurements show that there is in fact a considerable overlap between the two types. If all the measurements are considered together, it is evident that the olives range continuously from 1.5 cm to 0.1 cm and that it is, therefore, difficult to argue for two populations. The situation is probably more likely to reflect a range of maturity.

Figure 2. Olea europea *stones from Trench 10.*

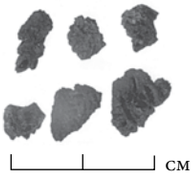

Figure 3. Preserved Olea *fruit flesh from Trench 2.*

Almonds

Amygdalus communis: 11 whole nuts were found; the rest were fragments identified from the characteristic pitting of the husk. Apart from one or two other fragments, they were found mainly in Trench 18, sample 18014.

Figure 4. Amygdalus communis *from Trench 18 showing characteristic pitting.*

Pomegranates

Punica granatum: in Trench 2, sample 2063, 20 pomegranates were found in a large pot. Parts of the fruit, the seeds, and the flesh were present in large and small fragments. Twenty calyx tubes, the tops of the fruit, were counted and gave the equivalent numbers of whole fruits.

Figure 5. Punica granatum *calyx tube from Trench 2.*

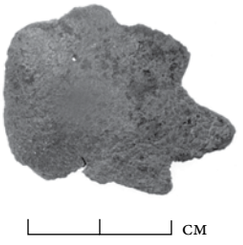

Figure 6. P. granatum *pericarp fragment.*

Grapes

Vitis vinifera was quite frequent in the samples and sometimes abundant. Pips were commonly recovered in low numbers in 25 percent of the samples, but also nearly 80 whole grapes were found in Trench 18, sample 18014, and many more pips in the rest of that trench.

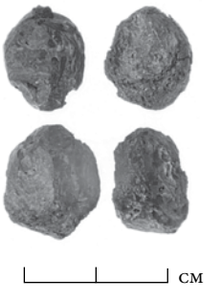

Figure 7. Whole Vitis *fruits recovered from Trench 18.*

Walnuts

Juglans regia was found in Trench 2, in the same pot as the pomegranates. The nut fragments were identified relatively easily; they weighed 12 g, or the equivalent of two nuts. The preservation was so good that associated with the nut the fragile endocarp was also found, a relatively rare survivor in charred remains.

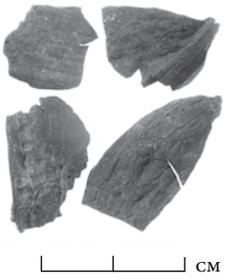

Figure 8. Juglans *nutshell fragments (Trench 2).*

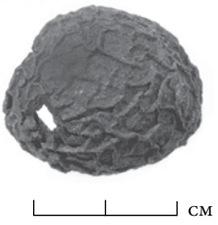

Figure 9. Juglans *endocarp from Trench 2.*

Pistachios

Fifteen nuts of *Pistacia atlantica* or *P. terebinthus* were found in Trench 18, sample 18014; the sample also contained whole grapes and many grape pips as well as several almonds. Only one other pistachio nut was found on this site, in sample 2004. Sample 18014 was a relatively rich fruit and nut sample. The nuts of the two species are difficult to tell apart and are of similar sizes; they are both edible when roasted and have other uses, soapmaking being one of them. In this case, however, because of the presence of the other fruits in the same sample, it is likely that they were present as food.

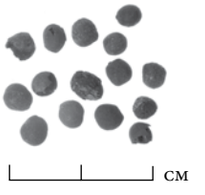

Figure 10. Pistacia *sp. from Trench 18.*

Pulses

Lentils, *Lens culinaris,* were the most common pulse, present in a few contexts in most trenches, in 23 percent of the samples. Other pulses included a few *Vicia faba* var. *minor*, horse bean, and some large seeds that may have been peas or similar but lacked the features (hila and testa) necessary to make more precise identifications.

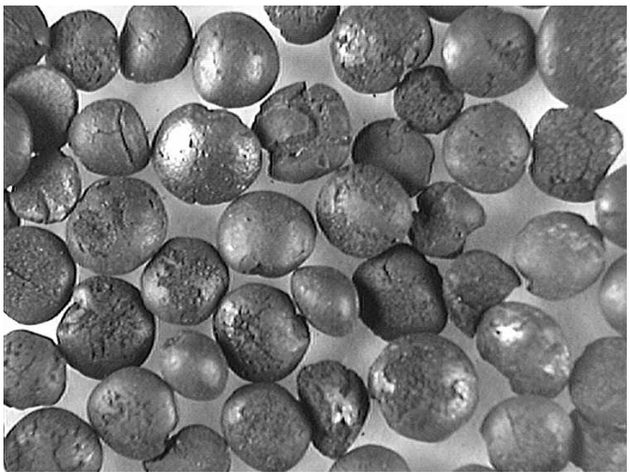

Figure 11. Lens culinaris.

Weed Seeds

The weed seeds were neither abundant nor very varied. They were typical weeds of crops and disturbed ground and were a mixture of weeds brought into the Near East with crops through time and of the local steppe variety. The only species that was a little more abundant was *Cephalaria syriaica* (27 seeds), found in sample 2059 in Trench 2, and it was the only weed seed species in that sample, which included little else. It was also found in sample 9011, Trench 9, which included a great number of wheat grains but few other weed seeds. Another species was represented by 70 specimens, *Hypericum*, which has small seeds difficult to identify to species. Several species are of woodland, grassy, damp habitat, but several other species grow in the steppe or on dry calcareous slopes.

Descriptions of the Assemblages by Trench

Trench 2

Most of the samples from Trench 2 came from two courtyard buildings. One of the buildings, at least, was probably burnt down during the Sasanian attack of A.D. 252/253. Six samples out of the 18 were cereal rich and belonged to destruction levels. The cereals were a mixture of the two types of wheat mentioned earlier and some chaff; barley was very sparse. Some other destruction levels and dumps in that trench did not include any cereals. Olives, on the other hand, were found in most samples in low numbers, except for three samples (2039, 2041, 2042) where whole olives and kernels as well as a number of stones were found. In this trench, the pot with 20 pomegranates and a number of walnuts shells and endocarp was also found. The density of the plant material in the cereal-rich samples was higher than in the other samples of the trench, not very surprisingly, as the bulk of the cereals was so much higher than that of the fruits and pulses. Although not particularly abundant, there were more weed seeds in the cereal-rich samples than in the other ones; these were typical weeds of crops.

Trench 5

Only two samples, a hearth (5000) and a make-up layer (5001), produced plant remains in Trench 5. They included low numbers of cereals, olives, pulses, and olives. The density of the plants was 3.9 and 1.7 items per liter.

Trench 7

Of the nine contexts of floors and destruction, none included rich or even moderately rich assemblages of plant remains. The samples included very few wheat grains, some barley grains (in one sample), a few olives in nearly all the samples, and virtually no weed seeds. This paucity of material is atypical.

Trench 9

Most of the samples in Trench 9 came from destruction levels, probably from the end of the Roman occupation or from the Sasanian attack. However, these samples were not very rich in plant remains except for sample 9011, which included a high number of wheat grains but no chaff to indicate the exact type of wheat. This, with a little cache of *Cephalaria syriaica*, a weed of the Compositae family, were the main elements of this assemblage. Another sample in the trench included over 100 lentils, along with a sprinkling of wheat grains and olives. No weed seeds were present. The rest of the samples included olives, a few grape pips, and nothing else. The density of material within the soil was quite low, apart from the two samples mentioned.

Trench 10

The 10 samples from Trench 10 came from fills of drains relating to a latrine and to associated floors. These did not prove very productive; few cereal grains were present, but olives were recovered from all the samples and in moderate numbers in two samples (10000, 10002). Apart from that, no other plant remains were present.

Trench 11

Only one sample was analyzed from Trench 11: a deliberate dump deposit from the rubble under a domestic floor. This produced a few grains of wheat, olives, and weed seeds, probably weeds of crops, including rare occurrences at Zeugma of millet seeds. The density of the material in the soil was 1.9 items per liter of soil.

Trench 12

Rather more cereal remains were present in the five samples from Trench 12, which came from Middle to Late Imperial destruction layers and backfill deposits. Barley was more abundant than wheat in sample 12004. Olive stones were present in all the samples. A few common weed seeds were also found. The density of the remains ranged from 0.2 to a maximum of 4.5 items per liter in sample number 12004.

Trench 13

All five samples in Trench 13 came from destruction layers caused by the Sasanian attack. These samples were very rich in cereals. Two of them, 13000 and 13002, produced almost exclusively barley grains; another one, 13034, comprised barley mixed with some wheat; and a fourth one, 13006, included mostly wheat grains. The last one, 13008, was not very rich and included fewer grains of both wheat and barley. The weed seeds were more abundant than in other samples of the site, especially samples 13002 and 13004; again fairly typical assemblages of weeds of crops, including *Spergula arvensis*. Sample 13002 also included some pulses, mainly lentils. The density of the plant material was high, 11.6, 35, 86, and 820 items per liter, this being very high for this site. The fifth sample, 13008, was quite low in density; only 1 item per liter, in spite of having a large flot, which indicates a high charcoal content.

Trench 15

The 13 samples of Trench 15 were thought to have come from a late public area that later became a commercial/residential area. Available dating indicates that the samples came from the Middle to Late Imperial phases. The plant remains are quite scattered in all these samples and are a mixture of low numbers of wheat and other badly preserved cereal grains, a few olives in all the samples, and hardly any weed seeds. There is an exception, sample 15034, which included some barley grains, quite a few pulses, including lentils, and quite a lot of typical weeds of crops. This sample had a density of 61.4 items per liter of soil. The sample came from a dump of burnt material within a robber cut, and although the whole deposit was sampled, the resultant volume of soil was still small, five liters, and may have yielded more information if it had been larger.

Trench 18

This trench may also have contexts destroyed by fire during the Sasanian attack. The contexts sampled were part of a large domestic structure. The plant remains in some of the samples, 18014 and 18015, do not include cereals but are fruit rich. Sample 18014 contained the most grapes, as pips and whole grapes. It also contained quite a few nuts of *Pistacia* (pistacio) and very little else. Sample 18015, on the other hand, comprised mostly olive pips and kernels. Another sample in this trench, 18025, which included some barley grains, grape pips, olives stones, and fig pips, also contained a number of weed seeds and as a consequence had the highest density in the trench: 13.5 items per liter. The rest of the samples in Trench 18 were quite poor in plant remains.

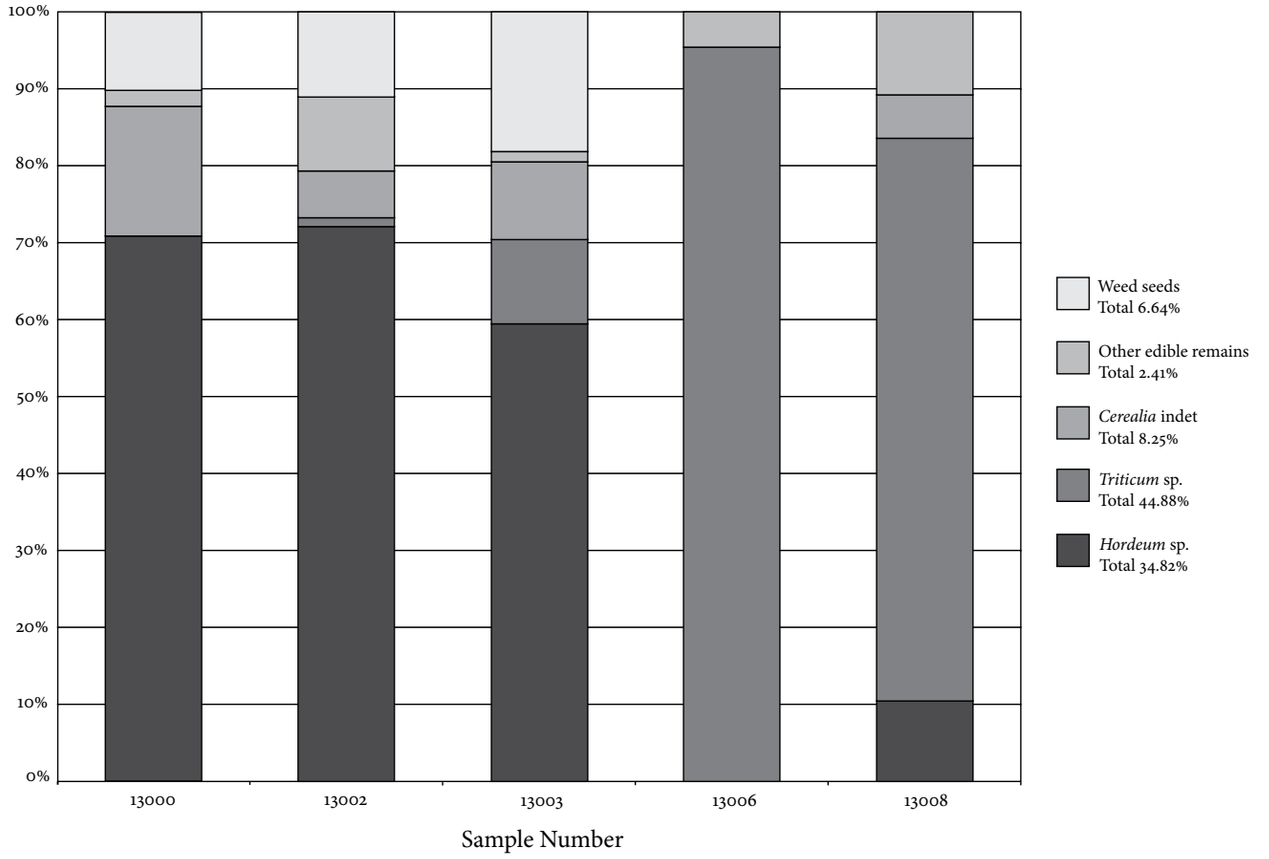

Figure 12. Quantitative analysis of identified plants from Trench 13.

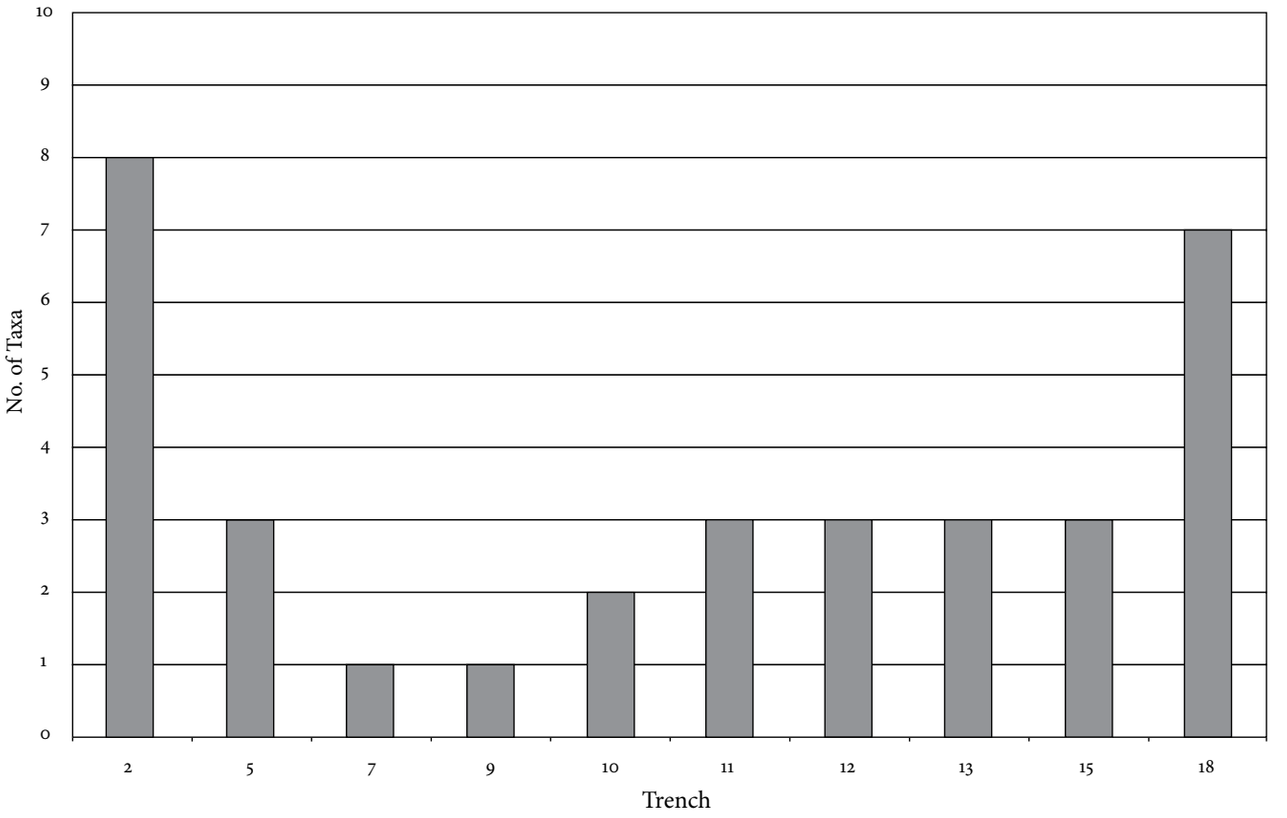

Figure 13. Summary of fruit and nut remains by trench (ubiquity analysis).

Trench	2	5	7	9	10	11	12	13	15	18
Cereal remains	7	2	4	5	4	1	4	5	10	7
Fruits/nuts	8	2	1	4	1	1	2	4	5	6
Olives	13	2	9	6	9	1	4	2	12	9
Pulses	3	2	1	2	0	1	2	2	4	4
Weed seeds	9	2	2	2	2	1	3	3	7	5
Misc.	3	1	0	1	0	1	0	0	1	2
No. contexts analyzed	16	2	9	8	9	1	4	5	13	9

Table 1. Summary of results by trench (ubiquity analysis).

DISCUSSION

The charred plant remains may be broadly divided into two categories: assemblages derived from several sources (e.g., deposits from make-up layers, drain fills, mixed destruction deposits, backfill deposits) and those that represent primary deposition of plant material (e.g., pot fills, non-mixed destruction deposits, hearths). The majority of the samples were from destruction layers, most of which represent mixed material from structural collapse and dumped deposits postabandonment. The sort of rubbish that is likely to have accumulated during construction/abandonment phases provides a useful picture of the general diet in the city. Most of the context-specific samples came from structures that had been destroyed by fire, possibly during the Sasanian attack (Trenches 2, 9, 13, 18), and provide insight into the details of daily life. When examining the results of the charred plant analysis, it was apparent that many of the initial aims of investigation could not be addressed. None of the deposits produced any evidence relating to plant uses for purposes other than food. There were no material deposits that could be considered ritual in function or deposition, even though the public/ceremonial areas in Trench 15 were extensively sampled. On this basis, it is appropriate to discuss the general picture — and details, where possible — of diet in the Roman city.

General Diet: Cereals, Pulses, and Olives

In modern traditional societies, hulled cereals are often parched to release the grain, after the initial winnowing and sieving stages,[4] and this practice is also referred to by Roman authors.[5] We know that we have a type of glume wheat, probably emmer, at Zeugma because of the presence of the few items of chaff recovered, but we do not know how important this crop was because of the difficulty of identifying the grains alone. It is therefore not possible to confirm or deny the assertion that the glume wheats

had largely disappeared from eastern Turkey after the Bronze Age,[6] as this may have been a minor element, possibly a contaminant of the free-threshing crop if the seeds had been imported. It is apparent from the composition of the samples at Zeugma that, although cereal remains were widespread across the site and recovered from every trench, most of the assemblages were comprised of grains and there was very little chaff (table 2). This indicates that crop processing was not taking place in the excavated areas. Moreover, the lack of chaff also indicates that cereals were being stored in the city as clean grain, not as unprocessed sheaves. Consequently, the archaeobotanical material from Zeugma represents stored grain and/or debris from cooking.

Trench	Total identified grain	Total identified chaff
2	579	28
5	37	3
7	11	1
9	622	0
10	10	0
11	4	0
12	17	9
13	513	10
15	11	7
18	46	2
Grand total	**1,850**	**60**

Table 2. Quantity of cereal grain and chaff by trench.

It is striking that the trenches that produced the greatest quantity of cereal grain (Trenches 2, 9, and 13) were destroyed by fire. These deposits were almost certainly formed from the burning of stores of cereal grain; indeed the paucity of any other category of remains in Trench 13 suggests that the particular room (13A) may have been used as a granary, at least immediately prior to destruction. The wall paintings suggest that the room's original function was not storage, but this may have been a secondary usage. As figure 12 shows, all the samples from this trench were made up of at least 80 percent cereal remains and there were separate stored deposits of barley and wheat grain. It is tempting to speculate that the residents of Zeugma may have stocked up their supplies of grain in preparation for the Sasanian attack.

The evidence for pulses at Zeugma is surprisingly limited in range and frequency. Lentil is clearly the most widespread legume, present in 16 contexts, and it presumably formed a large component of the local diet. However, it would be erroneous to infer on the basis of the archaeobotanical assemblage that the legume diet of the inhabitants of Zeugma was limited to lentils. Certainly, all of the major pulse crops, including *Citrillus sativum L.* (pea) and *Cicer arietinum L.* (chickpea), could have been grown in the region and were part of the earliest crops in Near Eastern agriculture.[7] The apparent lack of diversity may be due, in part, to preservation and difficulties in identification. It may also be related to the types of contexts analyzed. Deposits representing stored food material were not common and were only preserved by catastrophic fires, during the course of which a lot of mixing of material must have occurred. Moreover, the sample from Trench 9 that did represent a cache of lentils (sample 9026) was not actually that large, considering the average quantity of lentils that would be consumed in a single meal (estimated at several hundred). In this case, there is no suggestion that the stored material was related to the function of the room.

Olives were ubiquitous in the archaeobotanical assemblage, which is to be expected given the versatility of the fruit. In addition to food, the oil from the olive was used by the Romans for such diverse purposes as lighting, cleansing the body, medication, and as a grease for protecting wooden objects and leather articles.[8] None of the trenches excavated at Zeugma in 2000 provided evidence for olive presses. In any case, although olive stones were present in many samples across the city, the actual quantities were quite small. The largest deposit of olive stones came from Trench 10, rubbish material from drain fills and dumps, which makes the provenance of the olives difficult to ascertain. The fact that there were so few other plant remains in these Trench 10 deposits may indicate that pressing waste had been dispersed throughout the dumped deposits. Domestic stores of olives may be inferred from samples 2037 and 2042 in Trench 2. Although the quantities are small, they are not inappropriate for domestic consumption and the general spread of olive stones across the Trench 2 samples may represent mixing of destruction layers.

Fruit and Nuts

A range of fruit and nuts was recovered from the samples at Zeugma, some of which were extremely well preserved. Low levels of fruit seeds and nutshells were scattered across the site, of which grape seeds were most common. Figure 12 clearly demonstrates that most trenches produced between one and three fruit/nut taxa and that Trenches 2 and 18 produced a range of fruits. In fact, these remains came from two samples (2063 and 18014) of outstanding quality. It is assumed that both of these assemblages resulted from the burning of domestic residences during the Sasanian attack on Zeugma.

These assemblages are unusual because such remains are rarely recovered from archaeological sites. Not only is the preservation excellent (the endocarp of walnut and the pericarp of pomegranate are rarely preserved),[9] but these foodstuffs are considered luxuries in other areas of the Roman world.[10] But would these fruits have been unusual or exotic at Zeugma? Pomegranate and walnut both originated in the Caspian Sea area and northeastern Turkey, and archaeological remains have been recovered from the second millennium B.C. onwards.[11] Other fruits may have

originated from further afield, but they had become a characteristic element of the Mediterranean diet by the Roman period. Peach originated in China and was cultivated by the Romans from the first century A.D.[12] Pliny mentions peach as the most expensive fruit — sometimes fetching up to HS30 each.[13] He also bemoans the fact that, unlike other fruits, peach does not keep beyond two days. One of the samples (18033; fig. 14) that produced peach (*Persica vulgaris*) at Zeugma was from a pit dating to the Early Imperial phase, confirming that peach had been introduced to the area by the mid-second century A.D.

Figure 14. Persica vulgaris *stone and stone fragments from Trenches 2 and 18.*

There is much literature on the symbolism of certain fruits; in particular, pomegranate has long been associated with fertility and death, from the Bronze Age onwards,[14] and was a well known symbol in the Greek and Roman myth of Prosperina. Of course the practical uses of the fruit are also well attested in the literary sources; Pliny writes that the skin of the unripe fruit can be used for dressing leather and that the flower is used to produce a particular purple dye.[15] Given the presence of walnut in the same storage vessel as the pomegranate, the assemblage at Zeugma probably represents the remains of stored food. Indeed, pomegranate must have been considered quite an integral part of the Roman diet, even if it was something of a luxury, since it was eaten in such faraway places as London,[16] Switzerland,[17] Egypt,[18] and Libya.[19]

In fact, there are no food remains identified at Zeugma that are not present at these other Roman sites. It is striking that the archaeobotanical assemblage shows the diet at Zeugma to be consistent with the Roman diet in other parts of the empire. This is noteworthy when one considers the cultural mix of people likely to have been living in the city, and it is interesting to note that *Pistacia atlantica* (wild pistacio, or terebinth) was particularly associated by the Romans and Greeks with the Persian diet.[20] *P. atlantica* is a tree that would have grown wild in the region around Zeugma and is distinct (though related) to the cultivated pistacio, *Pistacia vera*. There were no finds of *P. vera* at Zeugma, though this species was introduced to the Near East in classical times.[21] Being right on the edge of the Persian Empire, it is plausible that the inhabitants of Zeugma were influenced by Persian cuisine and culture, in which the fruit of the terebinth played a part not only in cooking but also in ritual.[22]

Seasonality

The presence of so many fruits and nuts in the samples raises the question of seasonality. Most fruit will keep for a time if stored in suitable conditions,[23] but the presence of the endocarp of walnut in the storage vessel in Trench 2 (sample 2063) is noteworthy. The endocarp is very fragile and is not usually preserved; either the walnuts were fresh or they were being pickled. Since the walnuts were found in a pot predominantly full of pomegranates, it is most likely that they were fresh, indicating that the walnuts must have been placed in the pot, and the building burnt down, within a few weeks of harvesting. If this deposit does indeed date to the time of the Sasanian attack of A.D. 252/253, then this would place the sack of Zeugma in the early autumn, as walnuts are commonly harvested in mid–late September. Certainly, an autumn date for these deposits is not incompatible with the seasons during which ancient armies campaigned.

Cultivation and Trade

While there is little direct evidence from the archaeobotanical remains for the cultivation of crops or fruit trees, it is likely that most of the remains recovered are from local resources rather than imported from elsewhere in the Roman Empire. The region around Zeugma would have supported crop husbandry; there are fertile soils on the uplands to the east and west, as well as on the Hobab Plain near Apamea.[24] Indeed, all of the plants identified in the analysis could have been cultivated here and could even have been part of an export trade. Zeugma was on the trade route to the east and the Romans had a complex system of trade in food — certainly including cereal grain — but the Zeugma region is not usually included as a principal exporter of foodstuffs to Rome.[25] Moreover, it is known that most of these crops were also grown in Italy,[26] and the high cost of transport is seen by many economists as an impediment to the long-distance trade of foodstuffs, with the exception of spices and high-value luxuries. In any case, the archaeobotanical evidence at Zeugma is inconclusive.

CONCLUSIONS

The charred plant remains at Zeugma are consistent with the picture of diet from other Roman sites, indicating continuity in tastes and resources across the empire. However, one must conclude from the evidence that the assemblage from Zeugma does not provide a full picture of daily diet in the city; there is a clear absence of other components of the typical Roman diet, such as spices and dates, which are found archaeologically.[27] Of course, by their nature charred plant remains are biased and rarely provide a complete picture of diet, but unlike typical Roman assemblages from Europe that consist of rubbish and debris from cooking

and crop processing, the samples from Zeugma came predominantly from mixed destruction layers. Three conclusions may be drawn from this:

- The overall paucity of environmental remains indicates an efficient policy of rubbish removal.
- The areas of the city that were excavated were not used for such activities as ritual offerings.[28]
- Rare preservation of fruits was provided from specific contexts formed during the burning of buildings.
- The town was of a fully urban character and did not have semiagricultural activities (such as the dehusking of hulled wheats) occurring in the areas excavated.

Ultimately the results from the analysis at Zeugma reveal both a general idea of the staples of diet and a snapshot of life in the city, particularly at the time of the Sasanian attack in A.D. 252/253. There is exciting evidence that suggests that the Sasanian attack took place in the autumn. One can imagine the details of life at that time: a bowl of fruit filled with almonds and grapes; a jar full of pomegranates; vessels full of grain ready for milling. The presence of luxury food in the destruction horizons could suggest that the attack took the occupants completely by surprise. This would be consistent with the quantity of luxury items found in the same deposits. This study has demonstrated the value of archaeobotanical analysis, and it is hoped that it will pave the way for future work, both at Zeugma and at other Roman urban sites.

NOTES

1. We are indebted to the British Institute of Archaeology, Ankara, for the use of the archaeobotanical reference collection and laboratory facilities. Many thanks also to Claire Sampson for sorting the samples.
2. Davis 1960.
3. This discussion follows Hillman et al. 1996.
4. Hillman 1981.
5. e.g., Pliny, *HN* 18.
6. Nesbitt and Samuel 1996, 76.
7. Zohary and Hopf 1988, 83.
8. Pliny, *HN* 15.7.
9. Recently stated to be unique outside Italy (Jacomet et al. 2002), but the author knows of at least one other example (John Giorgi, pers. comm.).
10. Bakels and Jacomet 2003, 542.
11. Zohary and Hopf 1988, 150, 163.
12. Zohary and Hopf 1988, 159. For example, peach has been recovered from first-century A.D. Pompeii (Mark Robinson, pers. comm.).
13. Pliny, *HN* 15.15.
14. Ward (2003) reviews the evidence for pomegranate iconography in the ancient world.
15. Pliny, *NH* 13.23.
16. John Giorgi, pers. comm.
17. Bakels and Jacomet 2003.
18. Van der Veen 1999.
19. Van der Veen et al. 1996.
20. Sancisi-Weerdenburg 1995.
21. Zohary and Hopf 1988, 165.
22. Plutarch, *Artaxerxes* 3.2, describes a Persian royal ritual where a candidate for kingship removes his clothes, puts on a robe of Cyrus the Elder, and then eats a fig cake, some terebinth, and drinks a cup of sour milk.
23. Pliny (*NH* 15.18) says Varro recommends keeping pomegranates in jars of sand.
24. Wilkinson 1990, 10.
25. Tannahill 2002, 72.
26. Columella, *De Re Rustica* 2.6–10.
27. Jacomet et al. (2003, 553) comment that dates have been recovered from at least 13 sites in Central Europe.
28. Robinson (2002) provides evidence for the deliberate deposition of charred material in ritual at Pompeii.

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TABLES

Sample		**2000**	**2004**	**2009**	**2025**	**2029**	**2030**	**2037**
Context		**2095**	**2141**	**2012**	**2179**	**2251**	**2290**	**2032**
Context description		**Destruction layer**	**Destruction layer**	**Destruction layer**	**Pot**	**Destruction layer**	**Drain**	**Destruction layer**
Volume floated		**40**	**45**	**0**	**1**	**0**	**16**	**18**
Flot volume		**1,250**	**200**	**0**	**25**	**0**	**40**	**490**
% sorted		**12.5**	**50**	**100**	**100**	**100**	**100**	**12.5**
Cereals	**Plant part**							
Triticum free-threshing	free-threshing grain	164[1.5g]	19	–	3	–	7[5]	58[11]
Triticum free-threshing	tail grain	–	1	–	–	–	–	–
Triticum cf. hexaploid	rachis internode	–	7	–	1	–	–	–
Triticum sp.	grain	29[22]	–	–	–	–	–	[29]
Triticum sp.	spikelet base	–	–	–	–	–	–	–
Triticum sp.	glume/spikelet base	–	4	–	6	–	–	–
Triticum sp.	rachis internode	–	–	–	1	–	–	–
Triticum sp.	basal rachis	–	1	–	–	–	–	–
Hordeum distichon L.	hulled, straight	–	7	–	–	–	–	–
Hordeum distichon L.	rachis internode	–	1	–	–	–	–	–
cf. *Hordeum distichon*	grain	–	–	–	–	–	–	–
Hordeum sp.	grain	5	–	–	–	–	–	–
Cerealia indet.	grain	–	6[7]	–	2[1]	–	–	17[68]
Cerealia indet.	culm node	–	–	–	–	–	–	–
Cerealia indet.	embryo	1[1]	1	–	1	–	–	2
Cerealia indet.	rachis internode	–	–	–	–	–	–	–
Cerealia indet.	fragment	1.62g	–	–	–	–	–	–
Fruit/nuts								
Vitis vinifera L.	–	1	2	–	–	–	–	–
Pistacia atlantica/ terebinthus	whole nut	–	1	–	–	–	–	–
Citrillus type	–	–	–	–	–	–	–	–
Persica vulgaris Miller	–	–	–	1	–	–	–	–
cf. *Amygdalus* sp.	nutshell	–	[1]	–	–	–	–	–
Punica granatum L.	pericarp frag.	–	–	–	–	–	–	–
Olea europea L.	stone	–	[1]	–	–	[2]	1[1]	–
Olea europea L.	kernel	–	–	–	–	–	–	–
Olea europea L.	fruit flesh	–	–	–	–	–	–	–
Olea europea L.	stone	[1]	–	–	–	–	–	–
Ficus carica L.	–	–	1	–	–	–	–	–
Juglans regia L.	nutshell	–	–	–	–	–	–	–
Juglans regia L.	endocarp	–	–	–	–	–	–	–
Pulses								
Vicia faba L. var. *minor*	–	–	–	–	–	–	–	–
Lens culinaris Medik	–	–	–	–	–	–	–	–

Table 3. Samples from Trench 2. (Continued on next page.)

2039	2041	2042	2044	2049	2051	2052	2054	2055	2059	2063
2377	2465	2383	2158	2181	2158	2181	2016	2082	2029	2027
Pot	Make-up layer	Destruction layer	Dumped deposit	Dumped deposit	Dumped deposit	Dumped deposit	Pot	Destruction layer	Mud-brick	Pot
12	20	2	0	0	0	0	14	20	2	0
155	160	20	0	0	0	0	120	210	145	300
50	100	100	100	100	100	100	100	100	100	100
–	–	–	–	–	–	–	–	–	–	–
–		–	–	–	–	–	–	–	–	–
	–									
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	2	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	2	–	–	–	–	–	–	–	–	–
–	14[2]	–	–	–	–	–	–	–	–	–
1	–	–	–	–	–	–	–	–	–	–
1	–	–	–	–	–	–	–	–	–	–
–	1	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	2	–	–	–	–	–	–	–	–	–
***	–	–	–	–	–	–	–	–	–	–
–	4[1]	–	–	–	–	–	–	1	[1]	–
–	–	–	–	–	–	–	–	–	–	–
–	*	–	–	–	–	–	–	–	–	–
–	[1]	–	1	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	20
17[22]	21[16]	3[9]	–	1 [1]	1	[1]	1[2]	[1]	[4]	3[1]
–	13[2]	14[1]	–	–	–	–	–	–	–	–
–	–	0.23g	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	3	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	12g[2]
–	–	–	–	–	–	–	–	–	–	****
–	–	–	–	–	–	–	–	–	–	1[4]
–	4[2]	–	–	–	–	–	–	18[23]	–	–

Table 3. Samples from Trench 2. (Continued on next page.)

Sample		2000	2004	2009	2025	2029	2030	2037
Context		2095	2141	2012	2179	2251	2290	2032
Context description		Destruction layer	Destruction layer	Destruction layer	Pot	Destruction layer	Drain	Destruction layer
Volume floated		40	45	0	1	0	16	18
Flot volume		1,250	200	0	25	0	40	490
% sorted		12.5	50	100	100	100	100	12.5
Weed Seeds	**Plant part**							
Ranunculus sp.	–	–	–	–	–	–	–	–
Neslia sp.	–	–	–	–	–	–	–	–
Caryophyllaceae	–	–	–	–	–	–	–	–
Rumex sp.	–	–	1	–	–	–	–	–
Hypericum sp.	–	–	–	–	–	–	–	–
Cephalaria syriaica (L.) Schrader	–	–	–	–	–	–	–	–
Heliotropium sp.	–	9	–	–	–	–	–	–
Arnebia decumbens (Vent.) Cosson and Kralik	–	–	–	–	–	–	–	–
Buglossoides tenuiflora (L. fil) Johnston	–	–	–	–	–	–	–	–
Thymelaea sp.	–	–	–	–	–	–	–	–
cf. *Euphorbia* sp.	–	–	–	–	–	–	–	–
Crucianella type	–	–	1	–	–	–	–	–
Muscari sp.	–	–	–	–	–	–	–	–
Carex sp.	–	–	–	–	–	–	–	–
Panicum millaceum type	–	–	1	–	–	–	–	–
Setaria italica (L.) Beauv.	–	–	1	–	–	–	–	–
Gramineae indet.	seed	–	1 [1]	–	–	–	–	–
Gramineae indet.	culm node	–	3	–	–	–	–	–
Indet.	seed	–	8	–	3	–	–	–
Indet.	nutshell	–	–	–	–	–	–	–
Misc.	animal dropping	–	1	–	–	–	–	–
Misc.	fruit flesh	–	–	–	–	–	–	–
Misc.	seed	–	–	–	–	–	–	2
Misc.	pod	–	–	–	–	–	–	–
Misc.	vesicular frag.	–	***	–	–	–	–	–
Misc.	blocky frag.	–	–	–	–	–	–	–
Fumaria sp.	uncharred seed	–	2	–	–	–	–	–
Heliotropium sp.	uncharred seed	–	24	–	–	–	–	–
Buglossoides tenuiflora (L. fil.) Johnston	uncharred seed	2	8	–	–	–	15	–
Alkanna sp.	uncharred seed	3	–	–	–	–	–	–
Boraginaceae	uncharred seed	4	–	–	–	–	–	–
Total uncharred		**9**	**34**	**0**	**0**	**0**	**15**	**0**
Total charred		**3,160**	**156**	**1**	**18**	**2**	**14**	**1,496**
Items per liter		**79**	**3.5**	**0**	**18**	**0**	**0.9**	**83.1**

Table 3. Samples from Trench 2. (Continued on next page.)

2039	2041	2042	2044	2049	2051	2052	2054	2055	2059	2063
2377	2465	2383	2158	2181	2158	2181	2016	2082	2029	2027
Pot	Make-up layer	Destruction layer	Dumped deposit	Dumped deposit	Dumped deposit	Dumped deposit	Pot	Destruction layer	Mud-brick	Pot
12	20	2	0	0	0	0	14	20	2	0
155	160	20	0	0	0	0	120	210	145	300
50	100	100	100	100	100	100	100	100	100	100
–	2	–	–	–	–	–	–	–	–	–
–	1	–	–	–	–	–	–	–	–	–
–	2	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	70	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	23[4]	–
–	1	–	–	–	–	–	–	–	–	–
1	–	–	–	–	–	–	–	–	–	–
1	–	–	–	–	–	–	3	–	–	–
–	1	–	–	–	–	–	–	–	–	–
1	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	2	–	–	–	–	–	–	–	–	–
–	2	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	1	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
3	6	–	–	–	–	–	–	–	–	1
–	**	–	–	–	–	–	–	–	**	–
–	**	–	–	–	–	–	–	–	–	–
–	***	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–
–	1	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	**	–
–	–	–	–	–	–	–	–	–	***	–
–	–	–	–	–	–	–	–	–	2	–
–	–	–	–	–	–	–	–	–	–	–
–	–	1	–	–	–	–	–	–	1	–
–	–	–	–	–	–	–	1	–	–	–
–	–	–	–	–	–	–	–	–	–	–
0	0	1	0	0	0	0	1	0	3	0
94	179	27	1	2	1	1	6	43	32	30
7.8	9.0	13.5	0.0	0.0	0.0	0.0	0.4	2.2	16.0	0.0

Table 3. Samples from Trench 2 (continued).

Trench		5	5	7	7	7	7	7	7	7	7	7
Sample		5000	5001	7000	7002	7003	7004	7005	7013	7016	7017	7018
Context		5060	5075	7006	7180	7074	7154	7218	7076	7063	7004	7060
Context description		Hearth	Make-up layer	Destruction layer	Pot	Floor surface		Pot	Destruction layer	Floor surface	Destruction layer	
Volume floated		22	20	4	40	20	5	6	0.5	0.4	12	1
Flot volume		55	100	18	50	55	15	20	4	5	20	8
% sorted		100/50	100/50	100	100	100	100	100	100	100	100	100
Cereals	**Plant part**											
Triticum cf. *dicoccon*	spikelet fork	–	–	–	–	–	–	1	–	–	–	–
Triticum free-threshing	free-threshing grain	–	–	–	2	1	–	–	–	–	–	–
Triticum sp.	grain	1	1	–	–	1	–	–	–	–	–	–
Hordeum distichon L.	hulled, straight	4	4	–	–	–	–	–	–	–	–	–
Hordeum distichon L.	hulled	2[1]	–	–	–	–	–	–	–	–	–	–
cf. *Hordeum distichon*	grain	8	–	–	–	–	–	–	–	–	1	–
Hordeum sp.	grain	–	–	–	–	3	–	–	–	–	–	–
Cerealia indet.	grain	[5]	–	–	–	3	–	–	–	–	–	–
Cerealia indet.	culm node	–	3	–	–	–	–	–	–	–	–	–
Cerealia indet.	frag.	0.16g	–	–	–	–	–	–	–	–	–	–
Fruit/nuts												
Vitis vinifera L.	–	–	1	–	–	[1]	–	–	–	–	–	–
Olea europea L.	stone	5[5]	6[5]	[3]	1[1]	2[7]	[2]	[1]	[1]	[1]	[2]	1
Ficus carica L.	–	–	4	–	–	–	–	–	–	–	–	–
cf. *Ficus carica*	–	1	–	–	–	–	–	–	–	–	–	–
Vicia/Lens	–	1[2]	–	–	–	–	–	–	–	–	–	–
Lens culinaris Medik	–	3[1]	–	–	–	–	–	–	–	–	–	1
cf. *Lens culinaris*	–	–	3	–	–	–	–	–	–	–	–	–
Weed seeds												
cf. *Ranunculus* sp.	–	1	–	–	–	–	–	–	–	–	–	–
Fumaria sp.	–	2	–	–	–	–	–	–	–	–	–	–
Brassicaceae	–	2	–	–	–	–	–	–	–	–	–	–
Spergula sp.	–	[1]	–	–	–	–	–	–	–	–	–	–
Rumex sp.	–	1	–	–	–	–	–	–	–	–	–	–
cf. *Rumex* sp.	–	1	–	–	–	–	–	–	–	–	–	–
Chenopodiaceae	–	1	–	–	–	–	–	–	–	–	–	–
Leguminosae indet.	small	–	1	–	–	–	–	–	–	–	–	–
Buglossoides tenuiflora (L. fil) Johnston	–	1	–	–	–	–	–	–	–	–	–	–
Thymelaea sp.	–	1	–	–	–	–	–	–	–	–	–	–
Galium sp.	–	–	1	–	–	–	–	–	–	–	–	–
cf. *Galium* sp.	–	1	–	–	–	–	–	–	–	–	–	–
Lolium/Festuca type	–	–	–	–	–	–	–	–	–	–	1	–
Setaria italica (L.) Beauv.	–	1	–	–	–	–	–	–	–	–	–	–
Gramineae indet.	seed	–	1	–	–	–	–	–	–	–	–	–
Indet.	seed	2	–	–	–	1	–	–	–	–	1	–
Indet.	fruit	1	–	–	–	–	–	–	–	–	–	–
Misc.	twig	***	–	–	–	–	–	–	–	–	–	–
Vitis vinifera L.	uncharred seed	–	–	–	–	1	–	–	–	–	–	–
Fumaria sp.	uncharred seed	–	3[1]	–	–	–	–	–	–	–	–	–
Buglossoides tenuiflora (L. fil.) Johnston	uncharred seed	3	8	2	20[1]	–	–	1	49	–	–	–
Total uncharred		**3**	**8**	**2**	**0**	**1**	**0**	**1**	**49**	**0**	**0**	**0**
Total charred		**86**	**33**	**3**	**4**	**20**	**2**	**2**	**1**	**1**	**5**	**2**
Items per liter		**3.9**	**1.7**	**0.8**	**0.1**	**1.0**	**0.4**	**0.3**	**2.0**	**2.5**	**0.4**	**2.0**

Table 4. Samples from Trenches 5 and 7.

		Trench 9							
Sample		**9008**	**9011**	**9022**	**9023**	**9026**	**9029**	**9032**	**9033**
Context		**9198**	**9228**	**9074**	**9238**	**9138**	**9227**	**9001**	**9076**
Context description			**Destruction layer**				**Floor surface**	**Destruction layer**	
Volume floated		**4**	**4**	**20**	**12**	**12**	**12**	**0**	**6**
Flot volume		**35**	**550**	**20**	**15**	**50**	**10**	**0**	**1**
% sorted		**100**	**12.5**	**100**	**100**	**50**	**100**	**100**	**100**
Cereals	**Plant part**								
Triticum free-threshing	free-threshing grain	–	–	–	6	25[4]	1	–	–
Triticum sp.	grain	–	483[97]	–	–	–	–	–	–
Triticum sp.	embryo	–	111	–	–	–	–	–	–
Hordeum distichon L.	hulled, straight	–	–	1	–	–	3[1]	–	–
Cerealia indet.	grain	–	–	–	–	1	–	–	–
Cerealia indet.	embryo	–	–	–	–	1	–	–	–
Fruit/nuts									
Vitis vinifera L	–	1	1	–	–	[1]	–	–	–
Olea europea L.	stone	1[2]	[1]	–	–	[1]	[1]	1	[1]
Olea europea L.	kernel	–	1	–	–	2[4]	–	–	17[3]
Pulses									
Lens culinaris Medik	–	–	–	–	–	99[15]	1	–	–
Weed seeds									
cf. *Spergula* sp.	–	–	–	–	–	1	–	–	–
Cephalaria syriaica (L.) Schrader	–	–	22[2]	–	–	–	–	–	–
Androsace maxima L.	–	–	–	–	–	1	–	–	–
Galium sp.	–	–	1[2]	–	–	–	–	–	–
Indet.	seed	–	–	–	–	1	–	–	–
Misc.	fruit flesh	–	–	–	–	*	–	–	***
Misc.	vesicular frag.	–	****	–	–	–	–	–	–
Fumaria sp.	uncharred seed	–	1	–	–	–	–	–	–
Buglossoides tenuiflora (L. fil.) Johnston	uncharred seed	1	3[1]	15	2	6	40	–	–
Total uncharred		**1**	**1**	**15**	**2**	**6**	**40**	**0**	**0**
Total charred		**2**	**5,784**	**1**	**6**	**312**	**7**	**1**	**21**
Items per liter		**0.5**	**1,446.0**	**0.1**	**0.5**	**26.0**	**0.6**	**0.0**	**3.5**

Table 5. Samples from Trench 9.

Sample		10000	10001	10002	10003	10004	10005	10006	10007	10008	10011
Context		10041	10015	10038	10034	10021	10067	10035	10019	10019	10004
Context description		Drain		Robber trench	Make-up layer	Drain		Make-up layer	Floor surface		
Volume floated		20	40	40	22	20	12	20	35	20	40
Flot volume		80	70	125	50	80	50	20	20	60	40
% sorted		100/50	100	100/50	100	100/50	100	100	100	100	100
Cereals	**Plant part**										
cf. *Triticum* sp.	grain	–	–	–	1	–	–	–	–	–	–
cf. *Hordeum distichon*	grain	4	–	–	–	–	–	–	[1]	1	–
Cerealia indet.	grain	1	1	–	–	–	–	–	[1]	–	–
Fruit/nuts											
Vitis vinifera L	–	–	–	–	–	1	–	–	–	–	–
Olea europea L.	stone	27[38]	8[7]	37[54]	2[2]	12[7]	3[2]	[1]	[1]	6[16]	[1]
Olea europea L.	kernel	–	–	–	–	–	–	–	1[1]	–	3[2]
Weed seeds											
Leguminosae indet.	small	–	–	–	–	–	–	–	–	–	1
Gramineae indet.	culm node	–	–	–	–	–	–	–	1	–	–
Rubus sp.	uncharred seed	–	–	–	–	–	–	–	2	–	–
Buglossoides tenuiflora (L. fil.) Johnston	uncharred seed	2	32	2	4	–	1	6	–	4	2
Total uncharred		**2**	**32**	**2**	**4**	**0**	**1**	**6**	**2**	**4**	**2**
Total charred		**70**	**16**	**91**	**5**	**21**	**5**	**1**	**6**	**23**	**7**
Items per liter		**3.5**	**0.4**	**2.3**	**0.2**	**1.1**	**0.4**	**0.1**	**0.2**	**1.2**	**0.2**

Table 6. Samples from Trench 10.

Trench		11	12	12	12	12	12
Sample		11001	12000	12001	12003	12004	12005
Context		11034	12002	12011	12024	12011	12047
Context description		Make-up layer	Make-up layer	Destruction layer	Make-up layer	Destruction layer	
Volume floated		20	20	10	6	15	20
Flot volume		35	80	50	40	100	20
% sorted		100	100	100	100	100/50	100
Cereals	**Plant part**						
Triticum free-threshing	free-threshing grain	–	–	–	–	2	–
Triticum cf. hexaploid	rachis internode	–	–	–	–	1	–
Triticum sp.	grain	2	–	–	–	–	–
Hordeum distichon L.	hulled, straight	–	3	–	–	6	–
Hordeum distichon L.	rachis internode	–	–	–	–	3	–
cf. *Hordeum distichon*	grain	–	2	–	4	6[3]	–
Hordeum sp.	grain	1	–	–	–	–	–
Cerealia indet	grain	1	5	2	–	2	1
Cerealia indet	culm node	–	–	–	–	4	–
Cerealia indet	rachis internode	–	–	–	–	1	–
Fruit/nuts							
Vitis vinifera L.	–	[1]	–	–	–	2	–
cf. *Persica vulgaris*	–	[1]	–	–	–	–	–
Amygdalus sp.	nutshell	–	–	–	–	[1]	–
Olea europea L.	stone	1[5]	2[2]	[1]	[1]	2[5]	[1]
Ficus carica L.	–	–	2	–	–	–	–
cf. *Ficus carica*	–	1	–	–	–	–	–
Pulses							
Vicia/Citrillus/Lathyrus	–	–	–	–	–	1[1]	–
Vicia/Citrillus/Lens	–	2	–	–	–	–	–
cf. *Lens culinaris*	–	–	–	–	–	1	–
Leguminosae indet.	large	–	–	1	–	–	[1]
Weed seeds							
Neslia sp.	–	–	–	–	–	1[1]	–
Spergula sp.	–	1[2]	–	–	–	–	–
Rumex sp.	–	1	–	–	–	–	–
Polygonaceae	–	1	–	–	–	–	–
Chenopodiaceae	–	3	–	–	–	–	–
Malva sp.	–	1	–	–	–	2[1]	–
Trigonella type	–	1	–	–	–	–	–
Leguminosae indet.	small	–	–	–	–	6	–
Heliotropium sp.	–	–	1	–	1	–	–
Buglossoides tenuiflora (L. fil) Johnston	–	–	–	–	–	2	–
Thymelaea sp.	–	–	–	–	–	2	–
Crucianella type	–	1	–	–	–	–	–
Liliaceae	–	1	–	–	–	–	–
Carex sp.	–	–	–	–	–	1	–
cf. *Setaria italica*	–	1	–	–	–	–	–
Setaria italica (L.) Beauv.	–	2	–	–	–	–	–
Indet.	seed	5	1	–	–	–	–
Indet.	nutshell	[1]	–	–	–	–	–
Misc.	animal dropping	2	–	–	–	–	–
Misc.	vesicular frag.	**	–	–	–	–	–
Arnebia decumbens (Vent.) Cosson and Kralik	uncharred seed	–	–	–	1	–	–
Buglossoides tenuiflora (L. fil.) Johnston	uncharred seed	16	1	11	4	2	1
Total uncharred		**16**	**1**	**11**	**5**	**2**	**1**
Total charred		**38**	**18**	**4**	**6**	**68**	**3**
Items per liter		**1.9**	**0.9**	**0.4**	**1.0**	**4.5**	**0.2**

Table 7. Samples from Trenches 11 and 12.

Sample		13000	13002	13003	13006	13008
Context		13002	13033	13034	13036	13062
Context description		Dumped deposit		Destruction layer		
Volume floated		2	14	4	2	20
Flot volume		100	150	90	240	130
% sorted		100/50	100/50	100	25	100
Cereals	**Plant part**					
Triticum dicoccon Schrank	grain	2	–	–	–	–
Triticum dicoccon Schrank	glume base	–	–	2	–	–
Triticum free-threshing	free-threshing grain	–	1	–	214	–
Triticum cf. hexaploid	rachis internode	–	–	1	–	–
Triticum sp.	grain	–	1	1[10]	[174]	14
Hordeum distichon L.	hulled, straight	50[47]	41[31]	36[23]	–	1
Hordeum distichon L.	rachis internode	–	3	–	–	1
Hordeum distichon L.	embryo	–	[30]	–	–	–
Hordeum sp.	grain	–	–	1[23]	1	–
Cerealia indet.	grain	[25]	2[6]	[12]	–	–
Cerealia indet.	culm node	–	–	2	–	1
Cerealia indet.	embryo	8	–	3	21	–
Fruit/nuts						
Vitis vinifera L.	–	[1]	[1]	–	–	–
Prunus cf. *cerasus*	–	[1]	–	–	–	–
Olea europea L.	stone	1[1]	–	–	–	[2]
Ficus carica L.	–	–	3	–	–	–
cf. *Ficus carica*	–	1	–	1	–	–
Pulses						
Lens culinaris Medik	–	1	3[3]	–	–	–
cf. *Lens culinaris*	–	1	–	–	–	–
Leguminosae indet.	large	–	[4]	–	–	–
Weed seeds						
Ranunculus sp.	–	–	1	–	–	–
Brassicaceae	–	–	1	2	–	–
Arenaria type	–	–	–	1	–	–
Minuartia type	–	–	1	–	–	–
Spergula sp.	–	4	1[1]	3[1]	–	–
Gypsophila sp.	–	–	–	1	–	–
Silene type	–	1	1	2	–	–
cf. *Rumex* acetosella	–	1	–	–	–	–
Chenopodiaceae	–	1	–	–	–	–
Malva sp.	–	–	–	2	–	–
Leguminosae indet.	small	–	2	–	–	–
Compositae	–	–	–	1	–	–
cf. *Hyoscyamus* sp.	–	–	1	–	–	–
Solanaceae	–	–	1	–	–	–
cf. Solanaceae	–	–	1	–	–	–
Plantago coronopus L.	–	1	–	–	–	–
Plantago type	–	3	3	–	–	–
Crucianella type	–	–	–	2	–	–
Asperula sp.	–	1	–	–	–	–
Galium sp.	–	–	–	[1]	–	–
Muscari sp.	–	1	–	–	–	–
Gramineae indet.	seed	–	–	4[1]	–	–
Indet.	seed	3	3	4	–	–
Indet.	nutshell	[1]	[2]	–	–	–
Misc.	fruit flesh	–	–	–	**	–
Buglossoides tenuiflora (L. fil.) Johnston	uncharred seed	–	–	–	–	10
Alkanna sp.	uncharred seed	–	1[1]	–	–	–
Total uncharred		**0**	**2**	**0**	**0**	**10**
Total charred		**172**	**163**	**140**	**1,640**	**19**
Items per liter		**86.0**	**11.6**	**35.0**	**820.0**	**1.0**

Table 8. Samples from Trench 13.

Sample		15002	15006	15010	15011	15012	15025	15026	15028	15033	15034	15041	15042	15043
Context		15016	15007	15069	15048	15071	15110	15140	15150	15230	15231	15292	15295	15306
Context description		make-up layer	destruction layer	pit	make-up layer		destruction layer	pit	drain	robber trench		cistern	robber trench	drain
Volume floated		20	20	16	30	20	30	5	20	8	5	40	20	24
Flot volume		60	50	950	70	40	80	30	40	75	60	100	36	25
% sorted		100	100	100	100	100	100	100	100	100	100/50	100	100	100
Cereals	**Plant part**													
Triticum free-threshing	free-threshing grain	–	3[2]	–	–	–	–	1	–	–	–	–	–	1
Triticum sp.	grain	–	–	–	–	–	–	–	–	–	1	–	–	–
Triticum sp.	spikelet fork	–	–	–	–	–	1	–	–	–	–	–	–	–
cf. *Triticum* sp.	grain	–	2	–	–	–	–	–	–	–	–	–	–	–
Hordeum distichon L.	hulled, straight	–	–	–	[1]	–	–	–	–	–	27[7]	–	–	–
cf. *Hordeum distichon*	grain	–	–	–	–	–	–	–	–	–	–	1	–	–
Hordeum sp.	grain	–	3	–	–	–	–	–	–	–	–	–	–	–
Cerealia indet.	grain	–	[3]	–	–	1[1]	–	1	[2]	1	4[3]	–	–	[1]
Cerealia indet.	culm node	–	1	–	–	–	–	–	–	–	4	–	–	–
Cerealia indet.	embryo	–	7	–	–	–	–	–	–	–	–	–	–	–
Cerealia indet.	rachis internode	–	–	–	–	–	–	–	–	–	1	–	–	–
Cerealia indet.	frag.	–	**	–	–	–	–	–	–	–	***	–	–	–
Fruit/nuts														
Vitis vinifera L	–	2	–	–	–	–	–	1	–	–	–	–	–	–
Prunus cf. *cerasus*	–	–	[1]	–	–	–	–	–	–	–	–	–	–	–
Olea europea L.	stone	1[1]	[10]	6[1]	8[11]	[2]	1[4]	[1]	[1]	[1]	1[1]	3[7]	4[7]	–
Olea europea L.	whole fruit	–	–	–	–	–	–	–	–	–	1	–	–	–
Ficus carica L.	–	–	–	–	–	1	–	–	–	–	–	–	–	–
Pulses														
Vicia faba L. var. *minor*	–	–	–	–	–	–	–	–	–	–	1	–	–	–
Vicia/Citrillus/ Lathyrus	–	–	[2]	–	–	1	–	–	–	–	15[10]	–	–	–
Lens culinaris Medik	–	–	–	–	–	–	–	–	–	–	14[2]	–	–	–
cf. *Lens culinaris*	–	–	–	–	–	–	[1]	–	–	–	–	–	–	–
Weed seeds														
Adonis sp.	–	1	–	–	–	–	–	–	–	–	1	–	–	–
Fumaria sp.	–	–	–	–	1	–	–	–	–	–	1	–	–	–
Neslia sp.	–	1	–	–	–	1	–	–	–	–	–	–	–	–
Minuartia type	–	–	–	–	–	–	–	–	–	–	1	–	–	–
Spergula sp.	–	–	–	–	–	–	–	–	–	–	2	–	–	–
Chenopodiaceae	–	–	–	–	–	–	–	–	–	–	1	–	–	–
cf. *Erodium* sp.	–	–	–	–	–	–	–	–	–	–	3	–	–	–
Vicia sp.	–	–	–	–	–	–	–	–	–	–	2	–	–	–
cf. *Vicia ervilia*	–	–	–	–	–	–	–	–	–	–	3	–	–	–
Trigonella type	–	–	–	–	–	–	–	–	–	–	15[2]	–	–	–
Medicago sativa type	–	–	–	–	–	–	–	–	–	–	25	–	–	–

Table 9. Samples from Trench 15. *(Continued on next page.)*

Sample		15002	15006	15010	15011	15012	15025	15026	15028	15033	15034	15041	15042	15043
Context		15016	15007	15069	15048	15071	15110	15140	15150	15230	15231	15292	15295	15306
Context description		make-up layer	destruction layer	pit	make-up layer		destruction layer	pit	drain	robber trench		cistern	robber trench	drain
Volume floated		20	20	16	30	20	30	5	20	8	5	40	20	24
Flot volume		60	50	950	70	40	80	30	40	75	60	100	36	25
% sorted		100	100	100	100	100	100	100	100	100	100/50	100	100	100
Weed seeds (cont.)	**Plant part**													
Leguminosae indet.	small	–	1	–	–	5	–	–	–	–	12	–	–	–
Valerianella type	–	–	–	–	–	1	–	–	–	–	–	–	–	–
Cephalaria syriaica (L.) Schrader	–	–	–	–	–	–	–	–	–	–	3[1]	–	–	–
Androsace maxima L.	–	–	–	–	–	–	–	–	–	–	2	–	–	–
Arnebia decumbens (Vent.) Cosson and Kralik	–	–	1	–	–	–	–	–	–	–	–	–	–	–
Buglossoides tenuiflora (L. fil) Johnston	–	–	–	–	–	1	–	–	–	–	10	–	–	–
Marrubium type	–	–	–	–	–	–	–	–	–	–	1	–	–	–
Plantago lanceolata L.	–	–	–	–	–	–	–	–	–	–	1	–	–	–
Plantago type	–	–	–	–	–	–	–	–	–	–	7	–	–	–
Thymelaea sp.	–	–	–	–	–	–	8[1]	–	–	–	–	–	–	–
Crucianella type	–	–	1[1]	–	–	–	–	–	–	–	–	–	–	–
Galium sp.	–	–	2	–	–	–	–	–	–	–	5[2]	–	–	–
Bromus danthionae type	–	–	–	–	–	–	–	–	–	–	4[1]	–	–	–
Bromus secalinus type	–	–	–	–	–	–	–	–	–	–	2[2]	–	–	–
Lolium/*Festuca* type	–	–	–	–	–	3	–	–	–	–	4	–	–	–
Gramineae indet.	seed	–	–	–	–	–	–	–	–	–	2[2]	–	[1]	–
Indet.	seed	1	–	–	–	–	–	–	–	–	11	–	–	–
Misc.	seed	–	–	–	–	–	–	–	–	–	**	–	–	–
Misc.	vitrified frag.	–	–	–	–	–	–	–	–	–	***	–	–	–
Vitis vinifera L.	uncharred seed	–	–	–	5	–	–	–	–	–	–	–	–	–
Fumaria sp.	uncharred seed	–	–	–	–	–	–	2	1	–	–	1	–	–
Buglossoides tenuiflora (L. fil.) Johsnton	uncharred seed	1	50	–	2	–	7	1	2	4	–	23	5	–
Alkanna sp.	uncharred seed	–	2	–	30	–	–	–	–	–	–	–	–	–
Boraginaceae	uncharred seed	–	–	–	15	–	–	–	–	16	–	–	–	–
Total uncharred		**1**	**52**	**0**	**52**	**0**	**7**	**3**	**3**	**20**	**0**	**24**	**5**	**0**
Total charred		**7**	**40**	**7**	**26**	**17**	**16**	**4**	**3**	**2**	**307**	**11**	**12**	**2**
Items per liter		**0.4**	**2.0**	**0.4**	**0.9**	**0.9**	**0.5**	**0.8**	**0.2**	**0.3**	**61.4**	**0.3**	**0.6**	**0.1**

Table 9. Samples from Trench 15 (continued).

Sample		18014	18015	18020	18025	18028	18031	18032	18033	18034
Context		18070	18054	18084	18048	18098	18110	18117	18114	18115
Context description		Destruction layer	Destruction layer	Destruction layer	Destruction layer	Pit	Destruction layer	Pit	Pit	Pit
Volume floated		20	10	18	20	20	4	3	20	16
Flot volume		300	110	30	150	35	20	25	50	45
% sorted		100/50	100	100	100/50	100	100	100	100	100
Cereals	**Plant part**									
Triticum free-threshing	free-threshing grain	–	–	–	4	–	1	–	–	–
Triticum sp.	grain	–	1	–	–	1	–	–	1	–
Hordeum distichon L.	hulled, straight	–	–	–	7[2]	–	–	–	–	–
cf. *Hordeum distichon*	grain	–	–	–	4	–	–	[1]	1	–
Cerealia indet.	grain	–	–	3[2]	[13]	1	–	–	3[2]	–
Cerealia indet.	culm node	–	2	–	–	–	–	–	–	–
Cerealia indet.	embryo	–	–	–	3	–	–	–	–	–
Cerealia indet.	frag.	–	–	–	–	**	–	–	–	–
Fruit/nuts										
Vitis vinifera L	–	17[3]	1	[1]	36[11]	–	–	[1]	–	–
Vitis vinifera L.	whole grape	59 [20]	–	–	–	–	–	–	–	–
Pistacia atlantica/ terebinthus	whole nut	15	–	–	–	–	–	–	–	–
Citrillus type	–	–	–	–	–	–	–	–	1	–
Persica vulgaris Miller	–	–	[1]	–	–	–	–	–	[1]	–
cf. *Persica vulgaris*	–	–	–	–	–	–	–	–	[1]	–
Amygdalus communis L.	whole nut	3[7]	[1]	–	–	–	–	–	–	–
Olea europea L.	stone	1[4]	1[2]	[3]	14[4.14g]	[3]	2[7]	[4]	[2]	[4]
Olea europea L.	kernel	–	23[4]	–	–	–	–	–	–	–
Ficus carica L.	–	1	–	–	21	–	–	–	19	–
Juglans regia L.	nutshell	–	[1]	–	–	–	–	–	–	–
Pulses										
Vicia/Citrillus/ Lathyrus	–	–	–	[2]	–	[5]	–	–	–	2[1]	–
Lens culinaris Medik	–	–	–	2	4	–	–	–	2	–
cf. *Lens culinaris*	–	–	[1]	–	–	–	–	–	–	–
Weed seeds										
Adonis sp.	–	–	–	–	4	–	–	–	1	–
Ranunculus sp.	–	–	–	–	–	–	–	–	1	–
Fumaria sp.	–	–	–	–	5	1	–	–	–	–
Neslia sp.	–	–	–	–	1	–	–	–	–	–
Brassicaceae	–	–	–	–	1	–	–	–	–	–
Capparis sp.	–	–	–	–	1	–	–	–	–	–
Arenaria type	–	–	–	–	1	–	–	–	–	–
Spergula sp.	–	–	–	–	–	–	–	–	1	–
cf. *Spergula* sp.	–	–	–	1	–	–	–	–	–	–
Silene type	–	–	–	–	–	–	–	–	[1]	–
Rumex sp.	–	–	1	–	1	–	–	–	1	–
Polygonaceae	–	–	–	–	–	1	–	–	–	–

Table 10. Samples from Trench 18. (Continued on next page.)

Sample		18014	18015	18020	18025	18028	18031	18032	18033	18034
Context		18070	18054	18084	18048	18098	18110	18117	18114	18115
Context description		Destruction layer	Destruction layer	Destruction layer	Destruction layer	Pit	Destruction layer	Pit	Pit	Pit
Volume floated		20	10	18	20	20	4	3	20	16
Flot volume		300	110	30	150	35	20	25	50	45
% sorted		100/50	100	100	100/50	100	100	100	100	100
Weed seeds (cont.)	**Plant part**									
Hypericum sp.	–	–	–	–	1	–	–	–	–	–
Malva sylvestris L.	–	–	–	–	3	–	–	–	–	–
Malva sp.	–	–	–	–	2	–	–	–	–	–
cf. *Erodium* sp.	–	–	–	–	1[2]	–	–	–	–	–
Prosopis sp.	–	–	–	–	2	–	–	–	–	–
cf. *Vicia* sp.	–	–	–	–	–	1	–	–	–	–
Leguminosae indet.	small	–	1	1	8	–	–	–	8	–
cf. Leguminoseae	small	–	–	–	–	–	–	–	2	–
Valerianella cf. *lassiocarpa*	–	–	–	–	3	–	–	–	–	–
Centaurea cynasus/nigra	–	–	–	–	3	–	–	–	–	–
cf. *Centaurea* sp.	–	–	–	–	1	–	–	–	–	–
Sonchus arvensis L.	–	–	–	–	1	–	–	–	–	–
Androsace maxima L.	–	–	–	–	–	1	–	–	1	–
Arnebia decumbens (Vent.) Cosson and Kralik	–	–	–	–	–	–	–	–	6	–
Buglossoides tenuiflora (L. fil) Johnston	–	–	–	–	–	–	–	–	1	–
Plantago type	–	–	–	–	3	–	–	–	–	–
Thymelaea sp.	–	–	–	–	10	–	–	–	–	–
cf. *Quercus* sp.	cupule	–	–	–	[1]	–	–	–	–	–
Muscari sp.	–	–	–	–	–	–	–	–	2	–
Cyperaceae	–	–	–	–	1	–	–	–	1	–
cf. *Bromus* sp.	–	–	–	–	1	–	–	–	–	–
Lolium type	–	–	–	–	1	–	–	–	–	–
cf. *Setaria italica*	–	–	–	–	1	–	–	–	–	–
Indet.	seed	–	–	–	14	1	–	–	4	–
Indet.	nutshell	–	–	–	***	–	–	–	–	–
Misc.	fruit flesh	–	**	–	–	–	–	–	–	–
Misc.	pod	–	–	–	2	–	–	–	–	–
Misc.	vesicular frag.	–	–	–	***	–	–	–	****	–
Heliotropium sp.	uncharred seed	–	–	–	2	–	–	–	2	–
Arnebia decumbens (Vent.) Cosson and Kralik	uncharred seed	–	–	–	4	–	–	–	–	–
Buglossoides tenuiflora (L. fil.) Johnston	uncharred seed	13	4	1	1	14	25	14	4	34
Alkanna sp.	uncharred seed	8	–	–	–	–	–	–	–	–
Total uncharred		**21**	**4**	**1**	**7**	**14**	**25**	**14**	**6**	**34**
Total charred		**130**	**42**	**13**	**270**	**10**	**10**	**6**	**67**	**4**
Items per liter		**6.5**	**4.2**	**0.7**	**13.5**	**0.5**	**2.5**	**2.0**	**3.4**	**0.3**

Table 10. Samples from Trench 18 (continued).