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PLANT USE AT ÇADIR HÖYÜK, CENTRAL ANATOLIA

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Introduction

Çadır Höyük lies in a wide, flat valley within the Kanak Su Basin in the Yozgat Province of central Anatolia, close to the modern-day village of Peyniryemez. It is a multi-period site with levels spanning almost continuously from the Late Chalcolithic to the Islamic periods (Gorny et al. 1999, 2000); Gorny (2006) argues that Çadır Höyük is the ancient city of Zippalanda mentioned in Hittite texts. Ongoing excavations at the site, currently directed by Ronald L. Gorny of the University of Chicago and Sharon Steadman of the State University of New York College at Cortland, aim to "document the effect of environment on cultural change" in the region (Gorny et al. 2000: 153). Consequently, archaeobotanical studies form an important and integral component of work at the site. This paper outlines preliminary results of the analysis of the archaeobotanical remains from Çadır Höyük and supplement earlier archaeobotanical work conducted by Chernoff and Harnischfeger (1996).

Owing to the presence of well preserved plant remains from good contexts from the Late Chalcolithic to the Islamic periods, Çadır Höyük presents a very interesting opportunity for examining changes in plant use over time. The region surrounding the site is immensely rich in archaeological remains, yet few archaeobotanical studies have been conducted in the area to date (see Nesbitt and Samuel 1996). These results add to our knowledge of plant use and crop cultivation in Central Anatolia, and complement studies conducted further to the west at Gordion (McGovern et al. 1999) and Kaman Kalehöyük (Nesbitt 1993), and to the south and southeast at Çatal Höyük (e.g., Fairbairn et al. 2002), Titriş Höyük (Algaze et al. 1995), Hassek Höyük (Gregor 1992), Kurban Höyük (Algaze et al. 1986), Korucutepe (van Zeist and Heeres 1974), Girikihaciyan (van Zeist 1979–1980), and İmamoğlu Höyük (Oybak and Demirci 1997).

Archaeobotany provides insight into plant use in antiquity, including cropping systems (Hillman 1981, 1984; van Zeist 1993), the use of plants as medicine or for textile dyes (Hansen 1991; Smith 2005), and in some instances it can also reflect local environments (Miller 1997; Smith 2005). Archaeobotany can also provide insight into animal exploitation and grazing practices through the examination of seeds preserved in dung fuel, which reflects the types of fodder eaten (Miller 1984a, 1984b). The sorting and analysis of the archaeobotanical remains from Çadır Höyük is ongoing, but some interesting observations on plant use and crop production can be made.

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Environmental Setting and Land-use

Summers around Çadır Höyük are typically very dry with annual rainfall averaging between 370 and 425 mm, the bulk of which falls between October and June (Chernoff and Harnischfeger 1996). Investigation of the site was initially prompted by anticipated flooding following the construction of the Gelingüllü Dam as part of the Alişar Regional Project (Gorny 1994). At its maximum, the reservoir reaches the base of the southern slope of the tell (see Gorny et al. 1999: figure 18). This reservoir, while potentially submerging any ancient settlement on the southern side of the tell, allows for convenient flotation of archaeobotanical remains. In antiquity the most prominent water source is likely to have been the Eğri Ozu River, a tributary of the Kanak Su River (Chernoff and Harnischfeger 1996), and the area to the south of the mound would have been largely dry.

Unfortunately, very few palaeoenvironmental studies of remains contemporary with the site have been conducted in the area, and studies conducted elsewhere (e.g., Eastwood et al. 1999, Kuzucuoglu and Roberts 1997, Willis 1995, van Zeist, Woldring, and Stapert 1975) are not directly relevant due to the strong regional environmental contrasts across Anatolia. At Eski Acıgöl, just east of Tuz Gölü in northwestern Cappadocia pollen records demonstrate that diverse woodland species were present during the Neolithic around 8000 BP, after which time crop cultivation is evident (Woldring and Bottema 2001/2002). Woldring and Bottema (2001/2002: 28) also argue that by 4000 BP, contemporary with the rise of the Hittite Empire, oak coverage sharply declines perhaps as a result of the amount of wood required for iron production. This decline in oak was also observed by Roberts et al. (2001: 733) who note that the "unlike the well-watered uplands of southwest Turkey, neither forest nor steppe plant communities recovered from the mid-Holocene human impact in central Anatolia." A study by Bottema (1990) examined birch pollen (*Betula* sp.) from Kaz Gölü in Tokat province and Lâkik Gölü in Samsun, both north of the site. The little *Betula* pollen that is present in those cores over the past 5000 years is thought to represent "background noise" from Europe, and no climatic reconstructions are outlined. Other studies by Bottema, Woldring, and Aytuğ (1993/1994) spanning the areas of Abant, Yeniçağa, Kaz, Lâdik, and Taklı Gölü in northern Anatolia, suggest a relatively stable forest cover dominated by pine (*Pinus* sp.) between 7000–4000 B.P., after which time the picture is less clear.

Today, the fertile land surrounding the mound is heavily cultivated and agriculture dominates the local economy. Many local inhabitants are involved in large-scale farming for some part of the year, but food production is also important at the household level. Almost every house has a garden which provides a major source of fruit, vegetables, and herbs. The gardens are somewhat uniform and reveal an intimate knowledge of plant requirements and soil fertility management, frequently containing a combination of maize, beans, sunflowers, potatoes, peppers, tomatoes, cucumbers, lettuce, onions, squash, parsley, sorrel, hollyhock (*Alcea rosea* L. and *Alcea setosa* [Boiss.] Alef.), and grapes. A number of fruit trees including cherry, plum, pear, apricot, peach, and apple are usually planted around the borders of the garden, which have the added benefit of providing shade for the herbs. Maize grows quickly after planting and is often used as a support for the beans. This type of multi-cropping allows for a larger and more diverse yield per unit area; the combination of legumes, which enhance nitrogen levels within the soil, with a nitrogen demanding plant such as maize, also helps to maintain soil fertility. While the introduction of New World crops is clearly recent, it is likely that gardens also played a significant role in antiquity although their existence can be difficult to identify in the archaeological record (but see Miller and Gleason 1994). Villagers also collect a variety of wild plants. *Peganum harmala* L., known in Turkish as *üzerlik,* currently grows at Çadır Höyük and is frequently collected once it has dried in the field. It is strung to form wall hangings that ward off the "evil eye" (*nazarlık*), and highlights the varied and symbolic use of plants in the area.

On a larger scale, wheat, barley, rye, lentil, and chickpea form the five most important crops in the area, with cattle and sheep being the most important livestock. Chemical fertilizers are currently used, but soil fertility is also maintained by the rotation of cereals and legumes. A proportion of seeds from each harvest is normally stored and used for planting the following year and local farmers frequently trade or sell seed stock for planting, a practice that maintains genetic diversity and ensures that good quality stock is available. Locals associate the quality of harvests with the wind, identifying two types: hot, dry *lodos* winds blow from the south and dry out the growing wheat, resulting in less precipitation, and consequently lower yields and poor quality grain. *Poyraz* winds, from the north, are cooler and are associated with higher yields and better quality grain. Only the latter grain would typically be kept and traded as seed stock.

Following the harvest of a cereal, livestock graze on the stubble, and then the fields are burned. Field burning quickly and effectively removes cereal stubble facilitating plowing for the next season, and since it is cheaper than applying chemicals to speed decay of the crop remnants, the practice remains popular despite recent regional bans. Burns are usually carefully planned and timed to take into account wind speed and direction and the contents of adjacent fields. Ditches are sometimes dug to control the fire, but occasionally fires can spread uncontrollably and cause significant damage. During the 1999 season, the excavation team saw a field fire in the distance. Within 10 minutes, the fire rapidly spread over the site (Fig. 1). The fire was short-lived but burned all of the dried vegetation on the mound. In 1993, Ronald Gorny noted the presence of burning around Alişar Höyük that had been intense enough to burn through the bases of nearby telephone poles, leaving their tops suspended by telephone wires (personal communication 1999). Since Çadır Höyük, like many other mounds in the Near East, is surrounded by agricultural fields, the chance of such events occurring is high. Some projects may even intentionally burn mounds to clear them of dense vegetation or thistles making them easier to work on or survey. Such burning events are rarely considered relevant to archaeologists, but they could affect the interpretation of archaeobotanical remains, a factor that will be considered more thoroughly in the discussion.

Sample Collection and Recovery

A systematic method of collection was adopted at Çadır Höyük. Samples were collected from a variety of contexts, including hearths, floors, pits, and burials, but control samples were also collected from less-well defined contexts between recognized features, thereby allowing plant use across the site to be investigated. Samples were collected by excavators and placed into thick plastic bags ready for flotation by the archaeobotanist. From 1993 to 1999, Miriam Chernoff oversaw the collection and processing of samples and the current author continued the work from 1999 onwards. The flotation tank used at the site (Fig. 2) was made by a metal worker in the nearby town of Sorgun, under the supervision of Chernoff, following the design laid out by Nesbitt (1995). Water was conveniently drawn from the man-made reservoir at the base of the mound using a gasoline-powered pump.

The only modification to Nesbitt's design, was the use of a cloth square to line the top sieve. This technique facilitated the removal of the plant remains from the sieve and reduced the risk of damaging them, but occasionally needed careful monitoring. When processing very silty sediments, silts could float across the lip of the machine and line the cloth, eventually hampering water flow. Gentle manipulation of the sieve washed the sediments to one side, however, allowing water to pass through the sieve easily. Once flotation was complete, each sample was tagged and hung on a line in the shade to dry. Dry light fractions were then placed into containers, packed in plastic boxes, and taken to the archaeobotany laboratory at Boston University directed by Julie Hansen for analysis. Heavy fractions were dried and sorted at the site.[2]

Archaeobotanical Remains

The charred plant remains from Çadır Höyük are, on the whole, well preserved and document plant use over a long period of time. This report presents samples dating to the Chalcolithic, Hittite, and Byzantine periods and complements earlier work conducted by Miriam Chernoff who examined samples from Chalcolithic/Early Bronze I, Late Phrygian/Early Hellenistic, and Persian contexts (Chernoff and Harnischfeger 1996). The contents of 20 samples are presented here: context information for 18 samples is provided in Table 1 and their contents summarized in Table 2. Two other samples, which require special comment, are outlined in the discussion.

Discussion and Interpretation

The samples presented come from a variety of contexts including floors and inter-floors, pits, burials, hearths, pot contents, ovens, and shelf collapse. While knowledge of a sample's archaeological context is key in interpreting archaeobotanical remains, as

[2] A 1.5 mm mesh was used for the heavy fraction. For the light fraction, the muslin cloth lining a 0.5 mm sieve allowed for remains as small as 0.2 mm to be retrieved.

Hillman (1984) points out, often the converse can be true and archaeobotany can help define the function or nature of a particular context. Both instances apply in the interpretation of these remains.

Just as with faunal remains, it is important to consider how plant remains arrive at an archaeological site, the conditions that result in their preservation, and post-depositional factors, since all of these variables affect the interpretation of the finds. Most of the archaeobotanical remains from Çadır Höyük have been preserved through charring, although phytoliths and some mineralized plant parts are present. In the Chalcolithic levels of a domestic structure in Area 770.890, a concentration of phytoliths thought to be the remnants of a straw mat was found during the 2001 season. Such concentrated finds at the site, however, are not commonly observed.

The remains of a collapsed Chalcolithic shelving unit (L69) radiocarbon dated to 4700 ± 80 B.P. (uncalibrated, Beta 159391) were also recovered from Area 770.890 in 2001, and samples were collected across a 50 × 50 cm grid so that changes in plant presence over space could be assessed. With the exception of *Buglossoides arvensis,* which appears to be ubiquitous throughout the site, few weeds were present in the shelf samples, with domesticated species such as wheat, barley, lentil, and bitter vetch being slightly more abundant (sample 8). Many of the samples were essentially sterile, however. Since the shelves were wood, and were preserved by charring, any seeds stored on the shelves at the time of destruction would also have been charred and likely preserved. This was not the case. A large amount of pottery was associated with the shelves, but there is no evidence to suggest that they were used to store plant remains.

During the 2000 season, numerous Chalcolithic pits were excavated in Area 770.900, varying in both size and in the relative amount of charred remains recovered. The Chalcolithic pits presented here do not contain a huge amount of material, although it is tempting to suggest that domestic species dominate (see samples 3 and 9). A pit dating to the Hittite period (sample 12) was much richer and contained a greater diversity of weed seeds, but much more evidence is needed before temporal comparisons can be drawn. As McCorriston (1995) notes, middens and pits frequently represent accumulations of debris or waste over long periods of time, and do not present a single- or limited-use event such as hearths, thereby providing a different insight into plant exploitation.

Clear differences can be seen between the contents of two hearths (samples 10 and 13). Sample 13, a Hittite hearth radiocarbon dated to 2920 ± 70 B.P. (uncalibrated, Beta 159385), contains a large proportion of wood relative to seeds. A range of species and genera are represented, but there is a greater abundance of domesticated species such as wheat, barley, and various legumes, relative to weeds. Together, these data suggest that wood was used as the main fuel for the fire. The sample also contains a large amount of modern rootlets, resulting from proximity to the modern-day surface, indicating the potential for mixing and contamination. Sample 10, a Chalcolithic hearth, contains a much higher proportion of seeds and less wood charcoal. While domesticated species such as wheat, barley, and lentil are present, seeds from field weeds or forage plants dominate. The relative paucity of wood charcoal and domesticates, together with the presence of small legumes, some with their pods still attached, suggests that animal dung was the main source of fuel in this hearth. As Miller (1984b) has argued, undigested seeds frequently occur in animal dung, so the contents of this sample likely represent the various types of browse consumed by the animal that generated the dung. She has also observed that the frequency of dung use tends to increase in areas where wood is scarce (Miller 1990). Clearly more hearth samples from Çadır Höyük are needed before a pattern can be observed, but it interesting that wood was being used as a fuel during the Hittite period, a time when palynological evidence documents an opening of the landscape.

The floors contain a mixture of domesticates and weeds. The Hittite floor in Area 780.890 (sample 14) contained domesticated cereals and legumes but no weed seeds were observed. The Chalcolithic floors (samples 1 and 2) excavated in the deep sounding, yielded relatively smaller amounts of charred materials and contain mostly wheat, followed by lentils, and a range of weeds. Sample 5 was collected from an "ash installation" beneath the Chalcolithic floors in the deep sounding and lay directly atop Locus 67. A sample taken from Locus 67 (Area 770.900DS, FCN 3537) was essentially sterile, containing only several very small (1–2 mm) wood charcoal fragments that may have been worked down from upper levels. The ash installation may represent the earliest cultural deposits at the site, although its function remains unclear.

At the other end of the temporal sequence, remains from the "Terrace" dating to the Byzantine period are particularly interesting (sample 18). The Terrace is located just off the mound on flat agricultural land to the east of the tell. The context of sample 18 was initially designated an oven or burned area, but the contents are very unusual for an oven. The sample was associated with the remains of a metal plowshare and was close to a room that appears to be either a cellar or a barn. It contained a high proportion of free-threshing wheat species, 2-row hulled barley, cereal stem fragments, and *Galium* sp. seeds, more commonly known as bedstraw or cleavers. The abundance of rachis fragments allowed for the secure identification of *Triticum aestivum* (bread wheat) and *Triticum durum* (durum wheat), the latter of which is more drought tolerant. The presence of general such as *Atriplex* and *Salsola* may point to marshy or saline conditions around the site and if associated with the crop may be indicative of intensive irrigation. While the *Galium* seeds have not yet been identified beyond the genus level, their presence with large numbers of cereal stem fragments and barley seeds could indicate their growth as a crop weed. Hillman (1991: 31) notes that *Galium aparine* L. can dominate modern cereal crops in southern Britain "to the point where it flattens them and renders them unharvestable." While the ecological conditions in this part of Turkey are, and most likely were, very different from that in southern Britain, such an association is not unthinkable, and the *Galium* sp. seeds may have been collected together with the cereals being more suited for animal use than human consumption. The association of plant remains, when considered alongside the other archaeological finds, suggests that the area may have been part of a barn. This assertion is further supported by the presence of charred dung in the sample.

Several species appear consistently across the site and could be considered "background noise," the most notable being *Buglossoides arvense*, commonly referred to as “gromwell,” or “stoneseed” (Davis 1978; Post 1932: 240). These seeds preserve well due to their high silica content and frequently are thought to be modern contaminants as they are often uncarbonized. They are commonly found in the Near East, both in modern-day and archaeological contexts. Since the plant has few economic uses (although the roots can be boiled to make a medicinal tea), its ubiquity on archaeological sites is intriguing, as humans are unlikely to intentionally bring the plant to a site with a high degree of frequency. It is possible that the seeds could enter deposits, or become worked into deposits, during times of site abandonment, since gromwell is frequently found growing on deserted mounds today.

The notion of plant material entering the archaeological record during periods of site abandonment is an interesting one, and a process that deserves more attention. A number of studies have examined the general impact of fire on archaeological sites (e.g., Canti and Linford 2000), but the effect of modern fires (or historical fires during phases of site abandonment) on plant remains needs to be considered. Normally, the process of charring, and hence preservation, is associated with site-based human activity in antiquity, but as shown in Figure 2, vegetation covering a mound can easily be charred as a consequence of field burning. While working in the Near East I have witnessed numerous instances of mounds being accidentally burned, and since many are located in rural settings, it is likely that such events have affected most tells periodically. Burning typically last several minutes, and while the heat is intense, preliminary experiments by the author suggest that the heat generated by a brush fire (as opposed to the high sustained heat of a forest fire) is insufficient to char modern seeds buried several centimeters below the surface. The fire does, however, char plant material on the surface which may then be washed into cracks in the soil by rainfall or otherwise incorporated into the matrix constituting non-anthropogenic “noise” or contamination. Furthermore, during excavations recently charred material can be blown into trenches and contaminate samples. The presence of incompletely charred plant material in a sample from a Hittite burial (FCN 3490, Area 780.890, Feature 4, radiocarbon dated to 2840 ± 60 B.P., uncalibrated, Beta 146704) located close to the modern surface suggests contamination by a recent burn, possibly following the fire in 1999. If burning events occurred in antiquity some time after the primary deposition of a context, anachronistic contamination would be difficult to more detect because any uncharred components would decay, leaving only charred fragments of any partially burned seeds or wood.[3]

Conclusions and Comparisons

The samples discussed cover a range of contexts, including floors and inter-floors, pits, burials, hearths, pot contents, ovens, and shelf collapse. When the contexts are grouped, a number of general conclusions can be drawn. Floors generally contain a range of domesticated species such as wheat and barley, but also varying degrees of wild

[3] Due to contamination, this sample was not fully sorted and is not discussed any further here.

species. None of the pots contain a large amount of charred plant material and the remains more likely represent "background noise" than remnants of stored seeds. These samples are largely dominated by domesticated species such as wheat and lentil rather than weeds seeds, possibly reflecting the domestic contents in which the pots were found. The contents of the hearths vary, and document both wood and dung fueled fires, with a greater proportion of forage seeds relative to wood charcoal being found in the latter. The unusual find of a collapsed shelving unit yielded relatively sterile samples, but more information regarding the shelves and their function may be provided following the analysis of further samples. The "barn" context is notable, and may represent an enclosure used to house or feed animals.

It is too early to evaluate changes in plant use at Çadır Höyük over time but it is, nonetheless, useful to group the finds by time period for summary purposes. From the Chalcolithic samples, emmer and einkorn wheat (*Triticum dicoccum* and *T. monococcum* respectively), barley (*Hordeum* sp.), and lentil (*Lens culinaris*) appear to be the most important crops, with cereals being more numerous than legumes. Pea (*Pisum* sp.) and bitter vetch (*Vicia ervilia*) also appear, but are much less prevalent than lentils. These finds compare well with the Halafian remains from Girikihaciyan in southeastern Anatolia (van Zeist 1979–1980) where emmer was the main cereal crop followed by einkorn, hulled barley, and lentil, bitter vetch, and chickpea (*Cicer arietinum* L.). Chickpea has not yet been found at Çadır Höyük, however, and pea is absent from the Girikihaciyan remains. Similar finds of barley, lentil, and chickpea are also reported for Uruk contexts at Hassek Höyük (Gregor 1992).

Emmer and einkorn wheat, barley, lentils, and bitter vetch are also common in later samples from Çadır Höyük. Bread/macaroni wheat (*Triticum aestivum/durum*) has been found in samples dating to the Hittite and Iron/Byzantine periods, but has not been found in any Chalcolithic context (although Chernoff and Harnischfeger [1996] suggest the possibility of *T. aestivum* L. being present in Chalcolithic–Early Bronze Age I samples from the deep sounding at Çadır). The later samples also contain two-row hulled barley, which is not present in the Chalcolithic samples. Again, it is too early to draw temporal comparisons, but the more detailed information regarding barley in later periods could reflect differential preservation rather than any substantial differences in plant use. Much of the barley found in Chalcolithic samples is poorly preserved, and could only be identified to the genus level. Numerous Chalcolithic wheat grains are well preserved, suggesting that conditions at the site are conducive to preservation; the reason for this differential preservation is unknown. Interestingly, van Zeist and Bakker-Heeres (1975: 227) also note the poor preservation of *Hordeum* sp. in Chalcolithic finds at Korucutepe and Tepecik in the Altınova plain, eastern Anatolia. At these sites *Hordeum distichum* and *Triticum aestivum/durum* also dominate in younger samples dating to the Third millennium B.C.

Overall the plant remains at Çadır Höyük are well preserved and vary greatly between contexts. The site holds much potential to document changes in cultivation between the Chalcolithic and Islamic periods. Any study of agriculture is incomplete, however, without a zooarchaeological study; the multi-disciplinary approach adopted at Çadır Höyük will yield interesting results regarding changing modes of land use once examination of the plant and animal remains are complete and those data integrated.

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Table 1. Context information for samples presented

Sample No.	Area	Feature/ Locus	FCN	Context	Period	Sediment Vol. (l)	Flot mass (g)
1	770.900DS	F40(s)	2215	Inter-floor	Chalcolithic	30	1.98
2	770.900DS	F25(s)	2210	Plaster floor	Chalcolithic	20	2.14
3	770.900DS	L47	2469	Pit	Chalcolithic	15	1.76
4	770.900DS	L60	3121	Fill (next to L61)	Chalcolithic	20	4.50
5	770900DS	L66	3507	Ash installation	Chalcolithic	18	8.78
6	770.890	F54	4080	Plaster floor	Chalcolithic	20	8.15
7	770.890	F44	3394	Baby burial	Chalcolithic	8	2.56
8	770.890	L69	4649	Shelf collapse	Chalcolithic	14	6.52
9	770.900	F53/L75	3345	Pit	Chalcolithic	10	2.76
10	770.900	F26	2227	Hearth	Chalcolithic	10	3.64
11	770.880	L3	3029	Pot contents	Hittite	4	1.50
12	770.880	F13	5014	Pit	Hittite	32	24.50
13	780.890	F5	3199	Hearth	Old Hittite	37	56.94
14	780.890	F10	4413	Plaster floor	Hittite	16	10.33
15	800.930AB	F16	4160	Oven	Hittite	57	31.55
16	790.890	L23	4995	Pot contents	Iron	3	3.42
17	790.890	F8	4991	Oven	Iron	18	48.28
18	Terrace	F2	5389	Oven?	Byzantine	16	81.14

Table 2. Contents of samples (see Table 1 for context information).

Period	Chalcolithic										Hittite					Iron/ Byzantine		
Sample No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Cereals																		
Indet. Cereal	x		x	x				x		x	x	x			x		x	
Triticum sp.				x						x	x							
Triticum monococcum L.				x	x	x		x				x	x		x	x		x
Triticum dicoccum (Schrank) Schuebl.	x	x	x	x		x		x		x		x	x		x	x		x
Triticum aestivum/durum												x	x	x	x		x	x
Hordeum sp.	x	x	x		x	x		x	x	x	x	x	x	x	x			x
Hordeum vulgare L.									x			x	x	x			x	
Hordeum vulgare spontaneum type								x									x	
Hordeum vulgare distichum type													x		x		x	x
Hordeum murinum L.																	x	
Secale sp.										x								x
Cereal culm nodes				x		x				x	x				x		x	x
Cereal culm bases															x			
Spikelet forks	x	x		x		x			x	x		x			x		x	x
Rachis fragments											x	x			x		x	x
Sprouting embryos																	x	
Leguminosae																		
Indet. Leguminosae	x		x	x				x		x			x				x	x
Lens culinaris Medik.	x	x		x	x	x		x		x		x	x	x	x			x
Pisum sp.					x								x					
Vicia ervilia (L.) Willd.	x							x				x	x	x	x			
cf. *Vicia* sp.		x			x	x	x											
Indet. small legumes					x						x							
Medicago sp.						x				x								
Medicago type (+ pods)										x							x	
Trifolium type					x													
Boraginaceae																		
Buglossoides arvense (L.) Johnston	x			x	x	x		x	x			x			x		x	
Buglossoides sp.	x		x		x	x				x	x		x		x	x	x	
Echium sp.	x					x												
Echium vulgare L.												x	x					
cf. *Anchusa* sp.															x			
Cruciferae																		
Neslia sp.																	x	
Caryophyllaceae																		
Silene sp.			x				x											
Silene type	x									x	x						x	
Chenopodiaceae																		
Atriplex sp.																		x
cf. *Chenopodium* sp.	x					x			x	x							x	
Salsola sp.																		x

Period	Chalcolithic										Hittite					Iron/ Byzantine		
Compositae																		
Indet. Compositae					x					x					x			
cf. *Achillea* sp.	x																	
Cucurbitae																		
cf. *Cucumis* sp.	x																	
Cyperaceae																		
Carex sp.												x						
Scirpus sp.				x		x				x							x	
cf. *Scirpus* sp.										x			x					
Geraniaceae																		
Erodium sp.												x	x					
Graminae																		
Aegilops sp.																		x
Bromus sp.													x				x	x
Phalaris sp.	x			x						x								
Phalaris type	x	x				x							x					
Stipa sp.												x						
Indet. small grasses	x			x	x	x				x	x		x		x			
Fumariaceae																		
Fumaria sp.	x									x								
Hypericaceae																		
Hypericum sp.																	x	
cf. *Hypericum* sp.															x			
Labiatae																		
Indet. Labiatae	x		x														x	
Ajuga sp.				x		x									x			
Teucrium sp.			x									x					x	
cf. *Teucrium* sp.										x					x			
Linaceae																		
Linum sp.	x			x	x													
Malvaceae																		
Malva sp.						x												
Papaveraceae																		
Papaver sp.															x			
Planataginaceae																		
Plantago sp.										x								
Polygonaceae																		
Polygonum sp.													x					
Rumex sp.		x															x	
Rosaceae																		
cf. *Alchemilla* sp.																	x	
Rubiaceae																		
Galium sp.	x		x	x		x				x	x	x			x		x	x
Thymelaeaceae																		
Thymelaea sp.				x		x		x										
Vitaceae																		
Vitis vinifera L.																	x	

Figure 1. View of Çadır Höyük during an unintended brush fire caused by the burning of nearby agricultural fields. Charred plant material is visible at the top of the mound, with the flames moving down and to the left.

Figure 2. The flotation machine in use at Çadır Höyük during the 2000 season.