

B - CHALCOLITHIC CROPS FROM KURUÇAY HÖYÜK: AN INTERIM REPORT

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Introduction

About 50 botanical samples were collected by Prof. Refik Duru from his excavations at Kuruçay between 1978 and 1988. The 25 samples found to contain significant numbers of seeds are discussed in this report. More detailed accounts of the identification criteria, taphonomy of the samples, and the interesting group of flax weeds, will be published separately. The main goal of this brief report is to look at crop husbandry at Kuruçay in the regional context of Late Chalcolithic agriculture in western Anatolia.

Dating and stratigraphy of the samples

All the botanical samples are derived from burnt areas in levels 3, 6 and 6A. Level 6 is subdivided into three phases, the earliest 6c. then 6b and 6a. Levels 6A, of which 3000 square metres was excavated in 1984-5, and 6a were extensively burnt, while 3, 6b and 6c were partly burnt. Samples 19 and 22, excavated in 1979, were labelled as coming from levels 4 and 5 respectively, but as no burnt areas were found in these levels, it seems more likely that they come from the extensively burnt levels of level 6 and 6A.

Although the Early Chalcolithic level 7 was burnt, no samples were found, probably owing to the great intensity of the burning.

Levels 6A-3 belong to a Late Chalcolithic pottery tradition. Five radiocarbon dates from levels 6A and 6 are between 4.740-4.620 BP (calibrating to 3.620-3.350 BC).

There are detailed records for the location of some of the samples:

Phase 3

Samples 10, 11, 20 and 23 are from House 57, adjacent to Shrine 2, excavated in 1983. This house contained many jars and may have been a storeroom.

Samples 2, 3 and 5 come from Shrine 2, also excavated in 1983. Some houses in levels 3 and 6 contained a central stele, together with a hearth and oven, pots and, in one case, fragments of a grinding stone. Although described as shrines or temples, the mills, pots and grain found in these rooms suggests they had domestic functions too.

Phase 6A

Sample 1 : from Shrine 1 (room 8), excavated in 1983.

Sample 6: Room 16.

Sample 12: near House 18. Two large pots containing grain were found in the area between Houses 27 and 8.

Samples 16 and 18: from Room 24, found filled with pots, next to Shrine 1 and excavated in 1984.

Phase 6c

Sample 9: Room 27.

Samples 4, 7, 8, 14, 15, 17, 21, 25, 46 and 47 were not labelled, but must belong to levels 6A, 6 or 3 as only these had burnt areas. Given the extensive burning of 6A, this is the most likely source.

Composition of the samples

The botanical samples were allocated sample numbers before examination. A summary analysis of the samples is given in the table on page 90.

The purity of the seed samples, which contained little charcoal and were dominated by the seeds of usually just one crop species, with only minor admixture of other crops and weed seeds, immediately

suggested that these samples came from crop stores. In contrast, samples that derive from hearths and midden deposits (in pits, for example) usually contain a mixture of crop species, much chaff and weed seeds and charcoal or dung remains.

The four samples containing einkorn and emmer grain (10,11,14 and 15) also contain large quantities of einkorn and emmer chaff. The explanation for this became clear when, amongst the large quantities of loose grain and chaff, some intact spikelets and numerous fused pairs of emmer grains were found. The einkorn and emmer had been stored in the form of spikelets. When the deposits became charred in a catastrophic fire, the lighter chaff burnt away, leaving a mixture of loose grain and chaff.

The small amounts of admixed crop seeds in the other samples are consistent with mixing occurring on the threshing floor, or crops growing as weeds in other crops.

It is obvious that 25 samples cannot be a full representation of subsistence over three phases of a large settlement site. We only have a partial representation of those stores which happened to be preserved by burning and then came within the excavated area of the site. The fact that a wide range of cereals and pulses was found –broadly consistent with what would be expected at a site of this period– suggest that all the main crops are represented, but caution is needed in assessing the relative importance of the crops with such small sample numbers. Representation of minor crops and wild foodstuffs is probably much less reliable. Many wild foods might be eaten soon after collection, especially green vegetables, and would thus not be stored. The absence of fruit remains, for example of wild grape, is probably a matter of chance.

Even though the number of samples is small, and some of these lack provenance information, there is evidence that there was no major change in the crop species between levels 6A, 6 and 3. All the crop plants are present in samples from both level 3 and level 6A, with the exception of einkorn. The absence of einkorn from any of the level 6 samples is almost certainly a matter of chance. It therefore seems reasonable to consider the 25 seed samples as one group.

Overall at Kuruçay we have 4 emmer samples, 5 of hulled six-row barley, 5 of lentils, 3 of grass pea and 5 of flax. It seems reasonable to assume these were major crops. The position of free-threshing wheat (1 sample) and pea (2 samples) is less clear. Similarly, the importance of einkorn, present only as a mixture with emmer, is also unclear. In addition to these crops, terebinth nuts (either *Pistacia terebinthus* or *P. atlantica*) were gathered from the wild. Other wild foods were probably gathered but have not been preserved.

The plant remains are inevitably rather less informative about crop husbandry techniques, as the most informative elements –the weed seeds and chaff– have largely been cleaned from these seed deposits prior to their storage in the Late Chalcolithic village. It is, however, worth making the point that although agriculture in the region of the site today relies heavily on irrigation water pumped from wells, irrigation is unlikely to have been important before the modern period. Annual rainfall in the region is 600 mm, adequate for productive dryland farming, and there are few sources of water that are accessible without pumps. Lake Burdur itself is saline and thus unsuitable. Naturally areas around springs may have been used for small-scale fields, but there is no positive evidence for this.

Kuruçay Höyük in regional context

Little archaeobotanical evidence from other sites is available for comparison. Fourth millennium, Late Chalcolithic, crop remains have been studied from Çayboyu (under study by the author), Korucutepe and Tepecik (*van Zeist and Bakker-Heeres 1975*), all in eastern Turkey, 900 kilometres distant. The results from Çayboyu are similar in nearly all respects: emmer and six-row hulled barley are the most important cereals; free-threshing wheat, einkorn, peas, lentils, flax and terebinth nuts are also frequent. The significant difference lies in the abundance of bitter vetch (*Vicia ervilia*) and chickpea, and the absence of grass pea at Çayboyu. At Korucutepe and Tepecik similar results were obtained.

For the preceding, Early Chalcolithic, period there are three samples from the nearby late 6th or early 5th millennium BC site of Hacilar (*Helbaek 1970*), and some small samples from the Halafian site of

Girikhacıyan, in eastern Turkey (*van Zeist 1979-1980*). The three Hacilar samples are very small. A large sample of six-row naked barley, and the presence of a few bitter vetch seeds are the most interesting differences from the Kuruçay material. At Girikhacıyan bitter vetch and chickpea are again present, in addition to the usual species found at Kuruçay.

Abundant comparative material is available for the Ceramic Neolithic period. At Hacilar six-row naked barley and bitter vetch are again present. At Erbaba, southwest Anatolia, a large number of samples (c. 5.800-5.400 BC) have been published (*van Zeist and Buitenhuis 1983*). Emmer, free-threshing wheat and pea were most common, followed by naked six-row barley, einkorn wheat, lentil and bitter vetch. Hulled barley and grass-pea are present in small amounts, chickpea is absent. The ceramic Neolithic seeds from Çatal Hüyük (5.850-5.600 BC), not yet fully published, include large quantities of einkorn and naked barley, as well as bitter vetch (*Helbaek 1964*).

Given allowance for uneven numbers of samples, and varying locations, there are some interesting trends here. Most noticeably, six-row naked barley is more important than hulled barley at all the Early Chalcolithic and Ceramic Neolithic sites, save perhaps Girikhacıyan (where the samples are tiny). After this time naked barley disappears from the archaeobotanical record in Anatolia. Given that naked barley is much easier to process for human food, as there is no husk bonded to the seed to be painstakingly removed, what is the reason for this shift? It is unlikely to be because humans gave up eating barley, making the absence of a husk unimportant, as there is good evidence for human consumption of barley in the Iron Age (pots of barley husks have been found at Sardis and Gordion) and no reason to doubt the continuity of this practice. The most likely explanation lies in the consistently lower yields of naked barley.

A less clear-cut pattern is visible for the pulses. Lentil and pea are always important. The absence of bitter vetch at Kuruçay is puzzling, as it is present at earlier sites and might well grow as a contaminant of grass pea. In general, bitter vetch is common at all Turkish sites of all periods. It is a little surprising that larger numbers of chickpeas were not found at Kuruçay, but they were probably grown.

The large samples of grass pea are interesting, as this is an uncommon species. Kislev (1989) suggests that as the earliest finds of grass pea as a definite crop are from the eastern Balkan peninsula, this may be the area where it was first domesticated, probably stimulated by the arrival of agriculture from the Near East in the sixth millennium BC. Large quantities of grass pea appear at Greek sites in the sixth and fifth millennia; the first large Near Eastern samples (excluding Kuruçay) are from Syria after the mid-third millennium. The substantial samples from Kuruçay push this back to the mid-fourth millennium. Given the scanty nature of the evidence for western Turkey, the possibility that grass pea was domesticated in this area cannot be ruled out. If grass pea was not grown as a crop there, this would support Kislev's domestication zone of Greece, and fit in well with dispersal of cultivated grass pea from Greece into western Turkey quite soon after its domestication.

The group of flax weeds present at Kuruçay is another example of species previously found mainly at European and Aegean sites. The flax weeds are a group of specialist weeds that have the tall, narrow shape of flax plants combined with fruits or seeds that mimic the shape and size of flax seeds. They are therefore well adapted to being harvested with the flax crop and are difficult for farmers to remove during crop processing. The flax samples at Kuruçay contain many seeds of two known flax weeds, a ryegrass, *Lolium remotum*, and Gold-of-Pleasure, *Camelina sativa*. They also contain numerous seeds of a *Silene* species, possibly one of the flax-weed species in that genus. Today *Lolium remotum* and *Camelina sativa* are much more common as flax weeds in central Europe than in Mediterranean areas, but the early Kuruçay evidence suggests a Near Eastern or Aegean origin for these species.

Conclusions

The Kuruçay seed samples are the first Late Chalcolithic plant remains to be studied from a site in western Turkey. Their special value lies in three areas:

1. As evidence for the range of crops grown at one site at one period. This can then be integrated with evidence from other sites to look at how changing patterns in crop species are linked to wider economic changes. The evidence for grass pea as a definite crop is of particular interest.

2. As a study in the taphonomy of storage: for example, the evidence for storage of einkorn and emmer in partly processed form, as spikelets.

3. As amongst the earliest evidence for a package of specialised flax weeds found associated with flax seed stores.

The two millennia of the Chalcolithic period lie between two periods for which archaeobotanical evidence has had a vital role in understanding cultural development. In the preceding, Neolithic, period, the domestication of crops (and animals) seems to be closely linked to the spread of sedentary villages. Similarly, in the Early Bronze Age the shift to a more hierarchial society and settlement pattern has been linked to changes in agricultural systems including, for example, the domestication of the grapevine. In contrast, during the Chalcolithic period evidence for agricultural change seems to be limited so far to the disappearance of naked barley. Whether or not any more major changes took place, and how these are linked to wider socio-economic developments, for example at sites such as Çatal Hüyük, will not become clear until we have more seed samples such as those from Kuruçay.

Tablo Fırecak

PHASE	6A	3	3	-	3	6A	-	-	6c	3	3	6A	-	-	6A	-	6A	-	3	-	-	3	-	-	-
SAMPLE	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	21	22	23	25	46	47
SPECIES																									
<i>Cereals</i>																									
Einkorn wheat			x							xx	x		xx	x											
Emmer wheat						x		x		xxx	xxx		xxx	xxx	x										
Free-threshing wheat		x				x				x	x	x		x	xxx										
Six-row hulled barley		x				x		x		x	x	xxx	x	xx	xx	xxx		x	x				xxx	xxx	xxx
<i>Pulses</i>																									
Lentil	x	x	x	xxx	xxx	xxx	x	x	xxx	x				x		x	x	x							x
Pea		xxx	x			x	x	xxx				x							x						x
Grass Pea	xxx		xxx	x		x	xxx	x							xx										x
Chickpea	x			x																					
<i>Oilseeds</i>																									
Flax			x														xxx	xxx	xxx	xxx			xxx	x	
<i>Nuts</i>																									
Terebinth nut						x									x							xxx			

Summary of Kuruçay seed samples - Kuruçay bitkisel kalıntılarının listesi.
(x least abundant - az miktarda; xxx most abundant - çok miktarda)

Botanical names of crops in table - Listedeki bitkiler:

Einkorn wheat - Yabani Kaplıca Buğdayı (*Triticum monococcum*);

Emmer wheat - Yabani Çatal Siyez Buğdayı (*T. dicoccum*);

Free-threshing wheat - Sert/Yumuşak Buğday (*T. durum* - *T. aestivum*);

Six-row hulled barley - Altı Sıralı Kabuklu Arpa (*Hordeum vulgare*);

Lentil - Mercimek (*Lens culinaris*);

Pea - Bezelye (*Pisum sativum*);

Grass Pea - Mürdümük (*Lathyrus sativus* - *L. cicera*);

Chickpea - Nohut (*Cicer arietinum*);

Flax - Keten (*Linum usitatissimum*);

Terebinth nut - Menengiç (*Pistacia terebinthus/atlantica*).

ATATÜRK KÜLTÜR, DİL VE TARİH YÜKSEK KURUMU
T Ü R K T A R İ H K U R U M U Y A Y I N L A R I
V. Dizi – Sa. 44^a

KURUÇAY HÖYÜK II

1978-1988 KAZILARININ SONUÇLARI
GEÇ KALKOLİTİK VE İLK TUNÇ ÇAĞI YERLEŞMELERİ

RESULTS OF THE EXCAVATIONS 1978-1988
THE LATE CHALCOLITHIC AND EARLY BRONZE SETTLEMENTS

REFİK DURU

T Ü R K T A R İ H K U R U M U B A S I M E V İ A N K A R A
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