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HACINEBİ, TURKEY: Preliminary Report on the 1995 Excavations

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I. INTRODUCTION

The fourth field season of the Northwestern University salvage excavations at Hacınebi Tepe, Birecik district, Şanlıurfa province took place from July 6-August 30, 1995, directed by Gil Stein (Northwestern University). The excavations were funded with support from the U.S. National Science Foundation, the National Endowment for the Humanities, the National Geographic Society and the generosity of private donors.

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The project staff consisted of: Mr. Kenneth Boden (University of Arizona), Ms. Güner Coşkunsu (Istanbul University), Dr. Christopher Edens (Harvard University), Mr. Fokke Gerritsen (University of Amsterdam), Ms. Sarah Hinds (Cambridge Archaeological Unit), Ms. Kathryn Keith (University of Michigan), Ms. Çiğdem Köksal (Istanbul University), Dr. Alan Lupton (Cambridge University), Dr. Augusta McMahon (Cambridge University), Dr. Naomi Miller (University of Pennsylvania), Ms. Belinda Monahan (Northwestern University), Ms. Rana Özbal (Bates College), Ms. Julie Pearce (University of Pennsylvania), Dr. Holly Pittman (University of Pennsylvania), Ms. Lynn Rainville (University of Michigan), Mr. Joel Sweek (University of Chicago), and Ms. Anwen Tormey (Northwestern University). A team of 42 workers from the village of Uğurcuk (Hacınebi) assisted the project staff in the excavation and artifact processing activities.

assemblage. That there are no trays or basins identified in Locus 46 needs to be studied further before any conclusions may be drawn about the possible functional significance of this lacuna.

The final goal for analysis during the 1995 season was refining the Local Late Chalcolithic ceramic chronology in order to establish temporal subdivisions within Phase B. This research was to serve two purposes: a) to refine the ceramic typology so that a more detailed seriation may be performed, and b) to define specific ceramic types that reveal precise chronological identification based on their presence. The proposed chronological subdivisions within Phase B would be identified by ceramics that typify LLC contexts that are contemporaneous with Uruk levels, and by ceramics that are typologically "late" compared to the Phase A pottery, but predate the introduction of Uruk ceramics.

A total of 1550 diagnostic sherds were coded from two contexts expected to represent the two subphases (Phase B1 and B2). Operation 6, Locus 46 was used as the Uruk contemporaneous context (Phase B2), and Locus 179 from Operation 4, a large ashy layer overlying a clay surface (Locus 184) and abutting a large mudbrick platform represented the Phase B1 subdivision. Selected data for these contexts are presented in Table 6.

Several observations can be made based on these preliminary numbers. The hammerhead bowls Type IIa (B5) and Type IIb (B15) as well as the casserole J2 (Type XIIa) may be used as diagnostic types for Phase B2. The typologically early Hammerhead bowls Types IIg and IIi (B14, B31) and the Carinated bowl Type Va (B34) in conjunction with other late Hammerhead bowls Types IIa,d (B5 and B6) and the late band rim jar Type XVIe (J7), for example, may be used as B1 diagnostic types. One Band rim jar form not seriated by Pollock and Coursey Type XVIa (J19) appears to distinguish Phase B1 from Phase B2. Future research may involve a seriation within the band rim jar category to determine whether this is a true distinction. In addition, the frequencies of these forms need to be established for Phase A before they can be used alone to define a Phase B1 context. The typologically early forms (Type XXi/B31 and Type Va/B34) do not stand alone as distinctive of Phase B1. However, when these forms occur with other typologically late forms such as those described above, then a Phase B1 identification is possible.

There appear to be no distinctions between Phases B1 and B2 in terms of changing attributes, paste groups or surface treatment preferences. The mean widths of hammerhead rims for Phases B1 (2.20cm) and B2 (2.15cm) are almost identical. The incidence of flint-scraping on the exterior of hammerheads is very similar: 34% of all hammerheads in Locus 179 are scraped and 30% of all hammerheads in Locus 46 are scraped. These types of possible distinctions need to be explored further. Future research will need to focus on comparing possible Phase B1 contexts with Phase A contexts.

VI. ARCHAEOBOTANICAL REMAINS FROM THE 1995 SEASON

Naomi F. Miller (Museum Applied Science Center for Archaeology, University of Pennsylvania)

For the past several years small groups of archaeobotanical samples have been analyzed from Hacınebi. We have concentrated on the Late Chalcolithic (LC) and Uruk materials, with the goal of generating sufficient data to enable valid comparisons between earlier (LC A) and later (LC B) Late Chalcolithic deposits and between contemporary LC B and Uruk deposits (Miller 1996: Table 9). The current report details the contents of 12 additional samples (Table 7) and incorporates the results into a summary analysis of the Late Chalcolithic assemblage.

Taxa not previously reported for Hacınebi

A few fragments that may be olive (Olea europaea) and acorn (Quercus sp.) were seen, strengthening, however slightly, the impression that trees did not grow far from the site during the Chalcolithic. Olive had been domesticated in the Levant by the middle of the fourth millennium, though its spread to adjacent favorable regions is not well documented (Zohary and Hopf 1993). Today, vast groves are planted west of the Euphrates. Hacınebi lies outside the range of the wild ancestor of olive (ibid.), and pistachio and grape are the primary orchard crops today. Wild or cultivated, the Hacınebi olive pit fragments would not have had to travel far, but probably did not come from right around the settlement. Olive is now represented in two samples: HN 2028 (Late Chalcolithic), which was previously recorded as unknown because of its fragmentary and unique state (Miller 1996) and HN 7007 (LC B).

Other additions to the assemblage are the small herbaceous plants Ziziphora and Sherardia. A few examples of a grass compare well with type C from Selenkahiye (van Zeist and Bakker-Heeres 1985:fig. 7: 1,2,3), which van Zeist has since been determined to be Trachynia distachya (letter Feb. 6, 1994). All types found at Hacınebi also occur on other archaeological sites in the middle Euphrates valley.

Intra-site Comparisons

The newly reported samples can be incorporated into the frequency analysis (Table 8). Inclusion of the 1995 samples changes the order of the most frequent types reported in Miller (1996), but overall the picture is similar. As is typical of sites in the Near East, the most common wild plants are for the most part grasses and legumes along with a few other small plants (e.g., Galium). Among the cultigens, barley is most common in all phases. The hulled wheats, Triticum monococcum and T. dicoccum (both grain and rachis fragments), are more common in samples of the Late Chalcolithic A and B. Naked wheat (T. aestivum or T. durum) is more common in the Uruk samples, though the differences between phases are not statistically significant.

A number of measures can be calculated to help interpret the archaeobotanical assemblage. For example, the proportion of seeds to charcoal could be an indicator of dung fuel use relative to wood fuel and the proportion of weed seeds to cereals could reflect the practice of pasturing relative to stall foddering. Although average values for these ratios vary, there is so much overlap between samples of LC A and LC B provenience and between those designated LC B and Uruk that if the phases do indeed differ, it will take many more samples to discern.

Comparison with Nearby Sites

Botanical assemblages from several along the Euphrates river sites within the zone of rainfall agriculture have been examined (Miller 1994a): Sweyhat (Miller 1994b), Kurban Höyük (1986, unpublished data), Gritille (in press). Although not all come from the same time period, several generalizations seem valid. First, the amount of wheat relative to barley increases in samples taken from ordinary settlement debris as as one goes from south to north. This observation apparently reflects precipitation, and seems consistent over time. If cultural preference played a significant role in cereal choice, one might expect people of southern Mesopotamian cultural background to consume more barley than those from the north (cf. Powell 1984, Jacobsen 1982). Indeed, the Uruk enclave at Hassek Höyük had an unexpected absence of wheat and large store of barley in a burnt building (see Gregor 1992), though chance factors cannot be ruled out in explaining this. At Hacınebi, wheat seems to be at least as important in the samples designated Uruk as in those of LC B phase (Figure 19).

In order to assess the state of the vegetation cover (and fuel use), one can look at seed to charcoal and wild seed to charcoal ratios. As the charred material is from mixed trashy deposits, the seeds in it are likely to come from dung fuel (Miller and Smart 1984). Higher values reflect reduced wood availability. The state of the woodland depends on human activities like tree-felling and grazing as well as the natural vegetation. In Table 9, comparisons are restricted to contemporary levels at Kurban Höyük, which lies to the north. In particular, the proportion of seeds to charcoal is generally higher at Hacınebi, expected for that drier, less forested area.

A very rough way to evaluate dependence on herding relative to farming is to consider the diet of the herds. In particular, there seems to be some association between caprine herding and pasturing on the one hand, and cattle and pig husbandry and fodder cultivation on the other. The ratio of wild seeds to cultivated cereals is relatively high at Hacınebi, which suggests that herding played a more important role in the subsistence system. The comparison with contemporary Kurban Höyük is instructive. At Kurban, the weed seed to cereal ratio is 116 and caprines represent 28% of the identifiable bone. At Hacınebi, the figures indicate a greater reliance on pastoralism than at Kurban in both the earlier and later Late Chalcolithic phases: the weed seed to cereal ratio is substantially higher, and caprines represent about 44% of the assemblage in LC A and 72% in the later phase (LC B and Uruk combined) (Stein and Nicola 1996).

Overview

The main crops represented in the Hacınebi samples are barley, einkorn, emmer, free-threshing wheat, and lentil. Minor contributors to the assemblage include grasspea, grape, fig, and possibly almond and olive. The quantities of wood charcoal suggest a vegetation cover of steppe forest or open woodland.

Considered as a whole, Hacınebi plant use fits comfortably within the traditions of the middle Euphrates. Located within the rainfall agriculture zone of southeastern Turkey, its wild and cultivated plants were ecologically suited to the area. Since variation within each phase is usually high, simple averages of sample contents and ratios can be misleading. Even so, broad trends in the data are consistent with presumed environmental conditions such as rainfall and vegetation.

Future research will continue the attempt to ascertain what, if any, environmental or economic changes occurred between Late Chalcolithic A and B times, and whether or not cultural differences between local Late Chalcolithic people and their Uruk neighbors are reflected in plant use. At present, archaeobotanical evidence does not firmly support any such differences.

VII. CHEMICAL ANALYSIS OF A COPPER CHISEL FROM HACINEBI TEPE

Hadi Özbal (Boğazıcı University)

Two almost completely oxidized samples taken from a chisel found from the Chalcolithic context of Hacınebi Tepe (HN6561.1, butt end and HN6561.2, the working edge) are analyzed by Atomic Absorption Spectroscopy to determine their chemical composition. Since the samples were very small, and were almost completely oxidized, no metallographic examination was possible. With the present samples the aim of the study was to be able to identify the nature of the chisel, predict possible source of its origin and finally determine the method of its manufacture.

Chemical Composition

The chemical composition is determined by dissolving the samples in aqua regia and measuring the concentration of each element by atomic absorption spectroscopy (AAS). Arsenic is determined by electrothermal atomization while all the others are determined in flame.It can be seen from the trace element distribution that the chisel is made out of a highly pure copper containing no alloying elements. Chalcolithic copper from Anatolia do not contain in general any arsenic or tin (Esin 1969). The only major impurity in this sample is the presence of 1.24 % nickel at the working end. Small variations in the trace element distributions between the working end and the butt end are quite consistent with the general inhomogeneities observed in ancient metal objects. Trace elements of As, Sb, Ni, and Bi appear to be higher at the working end, however, there is no intentionality in this difference and it may be due to the smaller amount of corrosion at the working end.

TABLE 2: Relative Proportions of Canaanean and Simple Blades, by Operation

	Sample size	Canaanean blades		Simple blades	
Op. 1	134	13	9.7%	2	1.5%
Op. 4	1631	141	8.6%	27	1.7%
Op. 5	495	48	9.7%	9	1.8%
Op. 10	99	7	7.1%	3	3.0%
Op. 11	1294	100	7.7%	37	2.9%
Op. 16	367	19	5.2%	13	3.5%
Op. 17	276	108	39.1%	12	4.3%
1995 total*	4296	436	10.1%	103	2.4%

*Excludes the coded simple blades and blade cores from Op.14, Pit 50/77.

TABLE 3: Rates of sickle sheen and bitumen residue on blades

Blade type	Blade total	Sheen	Bitumen	Sheen and Bitumen	Total	
Canaanean	436	22	28	34	84	19.3%
Simple	103	2	1	1	4	3.9%

TABLE 4: Rates of blade modification

Blade type	Blade total	Denticulated		Truncated/backed		Other retouched forms	
Canaanean	436	14	3.2%	11	2.5%	17	3.9%
Simple	103	2	1.9%	1	1.0%	3	2.9%

Table 5: Comparison of vessel function in contemporaneous Uruk (locus 44) and local (locus 46)

	Bowls	Jars	Trays	Basins
Locus 44				
with BRBs (n=2174)	2,079 (95.63%)	77 (3.54%)	15 (.69%)	3 (.14%)
without BRBs (n=415)	320 (77.1%)	77 (18.6%)	15 (3.6%)	3 (.7%)
Locus 46				
with BRBs (n=482)	294 (61%)	188 (39%)	0 (0%)	0 (0%)
without BRBs (n=410)	222 (54%)	188 (46%)	0 (0%)	0 (0%)

Table 6: Local Late Chalcolithic Phase B: Selected Ceramic type frequencies

	Proposed Phase B1 Operation 4 Locus 179 n=1020		Proposed Phase B2 Operation 6 Locus 46 n=530		
Type	#	%	#	%	Description
IIg (B14)	38	3.73	3	0.57	Hammerhead (early)*
IIi (B31)	6	0.59	0	0	Hammerhead (early)
Va (B34)	40	3.92	0	0	Carinated bowl (early)
VIId (B64)	22	2.16	0	0	Ledge rim bowl
XVIa (J19)	14	1.37	2	0.38	Band rim jar
XVIe (J7)	12	1.18	18	3.40	Band rim jar (late)
IIa (B5)	21	2.06	62	11.70	Hammerhead (late)
IId (B6)	94	9.22	90	16.98	Hammerhead (late)
IIb (B15)	0	0	12	2.26	Hammerhead (late)
XIIa (J2)	4	0.39	55	10.38	Casserole (late)

* "Early" and "Late" distinctions defined by Pollock and Coursey

Table 7. Plant remains from Hacinebi Tepe: 1995

	LC	LC	LC A	LC B	LC B	LC B	LC B	URUK	URUK	URUK	URUK	URUK
HN no.	8911	8375	8747	7007	7053	7095	7844	9468	8624	9236	9265	9207
Operation	14	17	11	11	11	11	14	14	16	16	16	16
Locus	70	82	128	102	108	108	28	91	51	70	71	72
lot	105	56	275	206	213	229	40	132	77	121	127	112
volume (l)	9	16	12	12	10	14	9	14	9	12	10	6.5
charcoal >2 mm (g)	0.46	8.09	1.21	0.81	0.10	0.54	0.17	0.05	2.68	2.12	0.40	0.36
seed >2 mm (g)	0.24	0.76	2.02	2.33	0.07	0.18	0.18	0.01	0.13	0.85	0.32	0.17
rachis etc. >2 (g)	+	0.05	0.03	0.01	.	.	+	+	0.02	+	+	+
charcoal density (g/l)	0.05	0.51	0.10	0.07	0.01	0.04	0.02	+	0.30	0.18	0.04	0.06
seed/charcoal (g/g)	0.52	0.09	1.67	2.88	0.70	0.33	1.06	0.20	0.05	0.40	0.80	0.47
weed seed (#)	111	235	125	1020	178	442	25	4	16	355	545	122
weed seed/charcoal (#/g charcoal)	241	29	103	1259	1780	819	147	80	6	167	1363	339
weed/cereal (#/g)	241	255	51	327	2967	3683	83	133	178	370	1473	555
Crop and food plants												
Hordeum vulgare (g)	0.12	0.33	1.38	1.65	0.01	0.07	0.08	.	0.02	0.34	0.15	0.04
Triticum aestivum/ durum (g)	.	.	.	.	.	.	.	.	.	0.03	0.06	0.03
T. dicoccum (g)	0.03	0.05	0.01	0.10	.	0.01	0.03	.	0.02	0.02	.	.
T. monococcum (g)	.	0.02	0.03	0.06	.	.	.	.	.	0.01	+	.
Triticum sp. (g)	0.01	0.04	0.02	0.17	.	+	0.04	+	.	0.08	.	0.01
Cereal (g)	0.30	0.48	0.99	1.14	0.05	0.04	0.15	0.03	0.05	0.48	0.16	0.14
Lathyrus (g)	.	0.05	+	.	.	.	.	.	.	.	.	.
Lens (g)	0.01	0.02	0.04	0.03	0.01	0.04	.	.	0.01	0.08	0.03	0.03
Leguminosae indet.(g)	0.02	.	.	0.05	0.01	.	.	.	0.03	0.12	0.01	.
Vitis (g)	.	.	.	0.02	.	0.02	.	.	+	.	.	.
cf. *Prunus* (g)	.	.	.	.	.	.	.	.	0.01	.	.	.
cf. *Olea* (g)	.	.	.	0.01	.	.	.	.	.	.	.	.
cf. *Quercus* (g)	+	0.08	.	+	.	.	.	.	.	.	.	.
nut/fruit pit indet.(g)	.	.	.	.	.	.	.	.	.	.	0.02	.
Ficus	1	1	.	.	22	2	.	.	.	21	.	.
Linum	.	.	1	8	.	1	.	.	.	1	.	.
Wild plants												
Heliotropium	.	.	.	2	1	9	.	.	.	.	1	.
Gypsophila	.	1	.	.	.	5	.	.	.	2	.	.
Silene	2	.	.	8	.	.	.	.	.	.	.	1
Vaccaria	.	2	.	3	.	1	.	.	.	.	.	2
Chenopodium	.	.	.		.	4	.	.	.	.	.	.
Centaurea	.	.	.	4	.	.	.	.	.	.	.	.
Compositae 1	.	.	.	.	.	.	.	.	.	.	.	1
Compositae indet.	.	.	.	2	.	1	.	.	.	.	4	1
Cruciferae indet.	10	2	.	.	.	1	1	.	.	.	.	2
cf. *Carex*	.	1	.	.	.	.	.	.	.	1	.	.
Cyperaceae 1	.	.	.	.	.	1	.	.	.	.	.	.

Table 7. Plant remains from Hacinebi Tepe: 1995 (cont.)

HN no.	LC 8911	LC 8375	LC A 8747	LC B 7007	LC B 7053	LC B 7095	LC B 7844	URUK 9468	URUK 8624	URUK 9236	URUK 9265	URUK 9207
HN-Cyperaceae	1	.	.	.	.	3	.	.	.	.	.	.
Cephalaria	.	1	.	.	.	.	.	.	.	.	.	.
Aegilops	2	.	1	1	2	3	.	.	3	.	2	1
Avena	.	2	.	2	.	.	.	.	.	3	1	.
Bromus	.	1	.	.	.	.	.	.	.	1	.	.
cf. *Echinaria*	.	1	.	2	.	.	.	.	.	.	.	.
Hordeum murinum-type	1	.	1	1	2	1	2	.	.	.	.	.
Hordeum spontaneum -type	.	.	.	1	.	.	.	.	.	.	.	.
Lolium cf. *remotum*	10	7	30	108	.	.	.	.	.	30	246	18
Lolium	2	.	4	246	.	.	.	.	.	22	181	13
Phalaris	.	.	.	.	.	.	.	.	1	.	.	1
cf. *Trachynia distachya*	.	.	.	.	1	1	2	.	.	.	.	.
cf. *Triticum boeoticum*	.	.	.	7	.	.	.	.	.	.	.	.
HN-Gramineae 1 (*Phleum*-type)	35	23	9	39	30	60	3	4	5	145	24	15
HN-Gramineae 2	14	3	10	4	.	1	.	.	.	4	1	31
HN-Gramineae 3	.	1	.	.	.	.	.	.	.	.	1	.
HN-Gramineae 4	.	10	.	1	1	4	.	.	.	1	.	1
HN-Gramineae 6	.	.	.	.	.	.	.	.	.	3	4	.
HN-Gramineae 7	.	.	1	1	1	.	.	.	.	.	.	1
HN-Gramineae 9	1	1	2	2	1	.	.	.	.	.	.	.
Gramineae indet.	16	21	15	371	5	26	5	.	5	6	47	10
Hypericum	.	2	.	1	1	1	.	.	.	.	.	.
Teucrium	.	.	2	53	17	33	.	.	.	.	.	.
Ziziphora	.	.	.	.	8	33	.	.	.	.	.	.
Labiatae indet.	.	.	.	.	.	2	.	.	.	.	.	.
Astragalus	1	10	.	2	.	1	1	.	.	1	.	.
Coronilla	2	.	.	1	.	.	.	.	.	1	2	16
Medicago radiata	.	2	.	.	.	.	.	.	.	.	.	.
Medicago	.	2	.	.	.	.	.	.	.	1	1	.
Trifolium/Melilotus	4	24	5	30	.	1	.	.	.	6	3	4
Trigonella astroites-type	.	11	2	13	1	4	.	.	.	.	.	.
Trigonella	2	39	.	8	4	1	1	.	.	2	3	.
Leguminosae indet.	.	2	6	12	10	38	.	.	.	6	.	.
cf. *Bellevalia*	.	.	.	.	.	.	.	.	.	1	.	.
Malvaceae indet.	.	2	.	.	.	.	.	.	.	.	.	.
Papaver	.	1	.	.	.	.	.	.	.	7	.	1
Polygonum	.	.	.	1	.	.	.	.	.	.	.	.
Rumex	.	.	.	.	1	.	.	.	.	1	.	.
Galium	4	.	1	21	1	1	.	.	1	2	1	2
Sherardia	.	.	.	1	.	.	.	.	.	.	.	.
HN-Rubiaceae 1	.	.	.	1	4	10	.	.	.	.	.	.
Thymelaea	.	.	.	2	1	1	.	.	.	.	.	.

Table 7 . Plant remains from Hacinebi Tepe: 1995 (cont.)

HN no.	LC 8911	LC 8375	LC A 8747	LC B 7007	LC B 7053	LC B 7095	LC B 7844	URUK 9468	URUK 8624	URUK 9236	URUK 9265	URUK 9207
Umbelliferae indet.	.	.	.	2	.	.	.	.	.	2	.	.
Valerianella	.	1	.	.	.	.	.	.	.	1	.	.
Verbena officinalis	.	.	.	.	3	2	.	.	.	.	.	.
HN-Unknown 11 (cf. Solanaceae)	.	.	.	.	.	107	.		.		.	.
Unknowns	4	60	36	67	83	86	10	.	1	107	23	1
Plant parts												
Hordeum internode	.	2	1	2	.	1	1	.	.	1	.	.
Triticum aestivum/ durum internode	.	2	.	.	.	.	.	.	3	.	1	.
Triticum mono/dicoccum spikelet fork	10	18	9	46	.	3	21	.	.	89	6	1
Aegilops glume base	1	5	3	.	.	.	.	.	4	.	.	.
Taeniatherum rachis frag.	.	1	.	.	.	.	.	.	.	.	.	.
Grass culm node	.	3	.	.	.	.	.	.	.	2	1	.
Vitis penduncle	.	.	.	1	.	.	.	.	.	.	.	.
Uncharred seeds												
Alkanna	.	.	2	.	.	.	.	.	.	6	.	.
Arnebia decumbens	21	.	.	.	.		.	.	2	.	.	.
Lithospermum tenuifolium	3	20	13	1	4	20	5	.	10	2	5	1
Moltkia	.	.	.	.	.	1	.	.	.	.	.	.
Boraginaceae indet.	.	3	.	.	.	.	.	.	.	.	.	.
Fimbristylis	.	.	.	.	.	13	.	.	.	.	.	.
Cruciferae	.	.	.	.	.	.	.	.	.	1	.	.
Fumaria	.	1	3	.	.	.	.	.	.	97	.	.

Table 8. Frequency of most common types*

Phase	total N	LC %	LC A %	LC B %	Uruk %	
	N	38	8	6	15	9
Hordeum vulgare	34	100	83	100	67	
Lolium cf. remotum	29	88	100	73	56	
HN-Gramineae 1 (Phleum?)	27	75	83	73	56	
Trifolium/Melilotus	24	63	83	67	44	
Lens	19	38	50	53	56	
Triticum dicoccum	18	50	50	60	22	
Galium	18	38	33	60	44	
HN-Gramineae 2	16	25	83	33	44	
Aegilops	15	38	67	33	33	
Trigonella astroites-type	14	38	83	40	0	
Trigonella sp.	14	75	33	27	22	
Triticum monococcum	13	63	50	20	22	
Hordeum murinum-type	12	50	50	27	11	
HN-Gramineae 4	11	38	33	27	22	
Coronilla	10	13	17	33	33	
Triticum aestivum/ durum	9	38	17	7	44	
Astragalus	9	25	33	27	11	
Vaccaria	8	13	17	27	22	
cf. Echinaria	8	50	17	13	11	
Lolium sp.	8	13	33	33	0	
Teucrium	8	13	17	40	0	
Lathyrus	7	50	33	7	0	
Ficus	7	25	0	13	33	
Linum	7	25	33	13	11	
HN-Gramineae 7	7	13	50	13	11	
Silene	6	38	17	7	11	
Hypericum	6	25	0	27	0	
Plant parts						
Triticum spikelet fork	25	75	67	80	33	
Aegilops glume base	9	50	33	7	22	
Hordeum internode	8	13	33	33	0	

* Incorporates data from Miller (1996) and this report, Table 1.

Table 9. Summary ratios

	Hacınebi* LC A	Hacınebi* LC B	Kurban Uruk	Late Chalco.
no. of samples	5	12	6	28
seed/charcoal (g/g)	0.63	0.47	0.31	0.37
weed/charcoal (#/g)	122	329	318	32
weed/cereal (#/g)	218	730	482	116

* Includes samples with total density of charred material >0.06 g/l or wild seed density >5/l; HN 2149 omitted.

Caption for Figure 1: Comparison of barley and wheat

Table 10: Hacinebi Copper Chisel: Elemental composition

Element	Butt End	Working Edge
Cu	58.1 %	90.5 %
Sn	0	0
As	0.06	0.05
Sb	0.08	0.28
Ni	0.17	1.24
Zn	0.14	0.09
Co	0	0
Fe	0.60	0.56
Bi	0.07	0.18
Pb	0.03	0.05
Ag	0.02	0.03

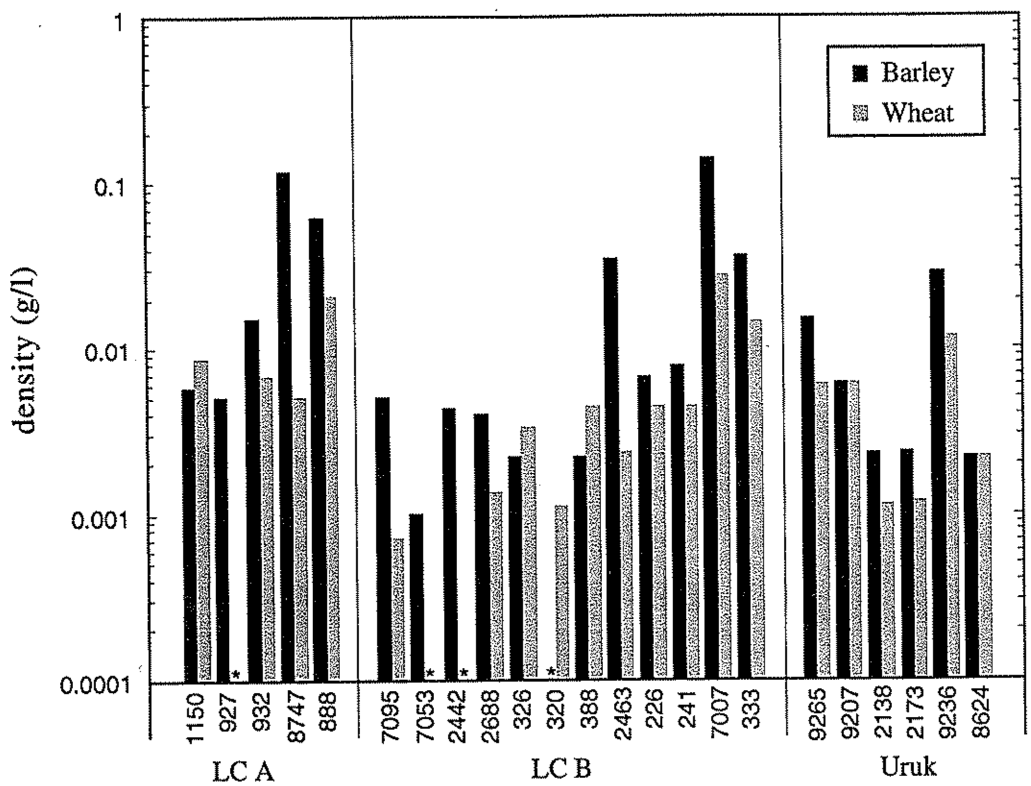

Fig. 19. Hacınebi wheat and barley representation.