

Archaeobotany at Kaman-Kalehöyük 2007

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ARCHAEOBOTANY FIELDSCHOOL

The first archaeobotany fieldschool, fully sponsored by Japanese Institute of Anatolian Archaeology (JIAA), was held at the Institute from the 8th to the 14th July 2007. Attended by Surja Lena (Albania), Meltem Cemre Ustunkaya (Turkey), Elif Beser (Turkey), Dilan Bozkurt (Turkey) and Kirsten Bradley (Australia), the fieldschool provided introductory-level on-site training in:

1) Field sampling and recovery methods for macrofossils and microfossils, including sampling at the Kaman-Kalehöyük excavations (Figure 1) and use of JIAA's flotation machine (Figure 2);

2) Recognition of key classes of plant remains (*e.g.* seeds, fruits, charcoals) in JIAA's archaeobotany laboratory (Figure 3);



Figure 1 On-site visit by archaeobotany fieldschool members



Figure 2 Working at JIAA flotation tank.



Figure 3 Working in JIAA field archaeobotany laboratory



Figure 4 Visiting JIAA conservation laboratory



Figure 5 Archaeobotany fieldschool members at the Lion Gate, Boğazköy

- 3) Archaeobotanical laboratory practices and procedures;
- 4) Identification of key Old World macrofossil groups, including the domestic cereals and legumes;
- 5) Quantification and analysis techniques for macrofossil remains;
- 6) Interpretation of results, including the role of ethnographic models and ecological information in understanding past environments, economy and agency;
- 7) Integration of archaeobotanical data with other studies, especially zooarchaeology – discussion included contributions by Dr. Levent Atıcı.

The fieldschool aimed to provide guidance for field archaeologists in contemporary archaeobotanical techniques, linking field practices to laboratory analysis and interpretative outcomes, focusing on the Bronze Age, Iron Age and Ottoman cultures represented at Kaman-Kalehöyük. Practical techniques were emphasized, within contemporary interdisciplinary research projects, and students were supplied with a range of study materials, including technical manuals and key readings, for future reference.

The fieldschool was a great success, in part because of the enthusiastic study and discussion undertaken by the fieldschool students. Students also took part in the daily Kaman-Kalehöyük excavation meetings and discussion of excavation findings led by Dr. Sachihito Omura, Dr. Masako Omura and Dr. Kimiyoshi Matsumura, who introduced students to the excavation facilities and findings. Ms. Serap Çelik provided information about the ongoing conservation program at JIAA and the ongoing collaboration with the archaeobotany team (Figure 4). Dr. Levent Atıcı also contributed to the students' experience with lively discussion of the integration of archaeobotanical and zooarchaeological analyses. While largely based at JIAA and nearby Kaman-Kalehöyük excavations, the fieldschool included a fieldtrip (Figure 5) to the excavations at Alacahöyük and Hattuša (Boğazköy). Following the fieldschool, several students returned to JIAA to take part in the excavations and one undertook Honours study in Australia on archaeobotanical samples from the site.

SAMPLING AND SAMPLE PROCESSING

Archaeobotanical sampling and sample processing continued throughout the 2007 field season. A total of 62 flotation samples representing 1420 litres of soil were processed from the 2006/2007 seasons (Table 1). In addition, 176 phytolith samples, mostly from pit linings, and 1 dendrochronology sample were also collected. The Kaman sample log was also brought fully up to date with site phasing and sample provenance information compiled from various site records and sample logs.

PRELIMINARY ANALYSIS

Preliminary analysis of samples continued at JIAA with 6 samples from pits, hearths and site fills in Phases IIa, IIc, and IIIc/IVa subject to assessment (Table 2). Sample assessment aimed to evaluate the range of preserved plant taxa in archaeological deposits from key site phases and should not be considered a complete census of preserved remains in the analysed samples. The analysis here complements sample assessments presented in earlier issues of *AAS* (e.g. Fairbairn 2002; 2004; Fairbairn *et al.* 2007).

Samples were moderately rich, all containing charred plant taxa and several containing mineralized plant remains, perhaps derived from stabling, dung or other moist anaerobic deposits. The highest seed concentrations were in the pit deposits and site fill 2007/019. Large quantities of cereal grain, chaff and weed seeds were present in several samples, with composite material, similar to dung, also identified. Wood charcoal assemblages were surprisingly small in size. Preservation of individual components was generally good, though many grains were vesicular, especially in samples 2007/019 and 2007/017. A sustained effort was made to increase the average sample size to between 40 and 60 litres of soil in the 2006 season and preliminary analysis supports this practice as all samples contained analytically useful quantities of charred and mineralized plant remains.

Cereal grain assemblages were dominated by free-threshing wheat, including hexaploid *Triticum aestivum*, based on preserved chaff, with hulled barley, including

six-rowed forms (*Hordeum vulgare*) and glume wheat also present. The glume wheat remains were common in the samples and mainly derived from einkorn (*Triticum monococcum*) where identifiable. Both chaff and grain of this taxon were present and the large quantities in sample 2007/061 were unusual for phase IIa samples. Bitter vetch (*Vicia ervilia*) was also identified but other crop seeds were absent, as were fruits with the exception of some mineralized fig seeds. Weed seed assemblages were diverse and abundant with a range of grasses, sedges and broad-leaved weeds identified. These included several classic weeds of autumn agriculture, typical of the assemblage found in other seasons at Kaman. The remains follow the general pattern described in earlier issues of AAS.

OTHER RESEARCH

In addition to preliminary sample analysis and assessment, Elizabeth Stroud completed a research project for her BA Honours Degree in Archaeology at the University of Queensland, entitled *Continuity or change in agricultural production at Kaman-Kalehöyük: An investigation using morphometrics and grain weight methods*. A paper based on the results will appear in a future issue of AAS.

BIBLIOGRAPHY

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Table 1 Flotation samples processed in 2007 at Kaman-Kalehöyük

Sample no.	Area	Sector	Grid	Provisional Layer	Feature	Phase	Date collected	Size (l)
2007/001	North	VI	XXXVI-55	86	P2985	llc	250806	70
2007/002	North	XXXI	XXIX ARADUVAR	6	H285	l	80806	1
2007/003	North	VI	XXXVI-54	80	P2997	llc	300806	28
2007/004	North	XX	XXXV-56	43	H286	lla	170806	80
2007/005	North	XX	XXXV-57	48	H294	lla	190906	24
2007/006	North	XX	XXXV-57	48	H293	lla	190906	30
2007/007	North	XX	XXXIV-67	15		lla	140905	10
2007/008	North	XIX	XXXVI-56	92	R396	lla	180906	40
2007/009	North	XIX	XXXVII-56	93	P3024	lla	200906	18
2007/010	North	XIX	XXXVI-56	79	H292	lla	120906	12
2007/011	North	XVIII	XXXVIII-56	54	P3014	lla	80906	26
2007/012	North	XVIII	XXXVIII-57	45	P2993	lla	290806	22
2007/013	North	XVIII	XXXVIII-57	48	P3013	lla	80906	16
2007/014	North	XVIII	XXXVIII-57	45	H291	lla	80906	9
2007/015	North	V	XXXVII-55	88	P2988	llc	250806	17
2007/016	North	V	XXXVII-55	84	P2979	llc	290806	22
2007/017	North	V	XXXVII-55	89	P2995	llc	290806	55
2007/018	North	V	XXXVII-55	83	P2975	llc	150806	70
2007/019	North	V	XXXVII-55	82	P2935	llc	150806	60
2007/020	North	XXXII	XLIII-50	58	P2974	llc	140806	16
2007/021	North	XXXII	XLII-50	40	H277	llc	120905	5
2007/022	North	XXXII	XLII-50	55	H283	llc	150806	20
2007/023	North	XXXII	XLII-50	56	H284	llc	150806	10
2007/024	North	XXXII	XLIII-50	66	P3010	llc	70906	48
2007/025	North	XXXII	XLIII-50	69	P3022	llc	180906	30
2007/026	North	XXXII	XLIII-50	67	P3011	llc	70906	30
2007/027	North	XXXII	XLIII-50	60	P2984	llc	210806	35
2007/028	North	XXXII	XLIII-50	55	P2948	llc	120906	30
2007/029	North	XVI	XXXV-53	66	P2983	llc	180806	35
2007/030	North	IX	XXIX-54	16	P3003	llc or llb	10906	40
2007/031	North	IX	XXIX-55	17	P2998	llc or llb	300806	31
2007/032	South	LV1	LII ARADUVAR	13	P435	lla	180806	28
2007/033	South	LVIII	XXXII ARADUVAR	8		llc	210806	15
2007/034	South	LV1	LII ARADUVAR	14	P621	lla	180806	10
2007/035	North	XXXI	XXIX ARADUVAR	16	R222	l	190906	30
2007/036	South	LVII	LVIII ARADUVAR	10	P775	lla	250706	40
2007/037	South	LV1	LVIII ARADUVAR	10	P775	lla	2006?	0.5
2007/038	South	LII	LV-48	55	P788	llc	40707	9
2007/039	North	IX	XXIX-55	23	P3025	llc or llb	20707	25
2007/040	South	LVII	LVIII ARADUVAR	10	P775	lla	250706	6
2007/041	North	XXXI	XXIX ARADUVAR	6	P2969	l	80806	0.25
2007/042	North	V	XXXVII-54	83		llc	300606	0.25
2007/043	North	XIX	XXXVI-56	71		lla	160806	0.25
2007/044	North	LIX	LVIII-48	20		?	240806	0.25
2007/045	South	LVIII	XXXII ARADUVAR	4	P768	lla	100806	0.25
2007/046	South	LVII	LVIII ARADUVAR	10	P775	lla	250706	5
2007/047	North	IX	XXXIX-54	23	P3012	llc or llb	120707	25
2007/048	North	IX	XXIX-55	25	P3026	llc or llb	90707	28
2007/049	North	VII	XXXII-55	57		llc	130707	23
2007/050	North	VII	XXXII-54	16	P3027	llb	160707	16
2007/051	North	IX	XXIX-55	27	P3028	llc or llb	160707	27
2007/052	North	VII	VIII ARADUVAR	46	P3029	llb	170707	46
2007/053	North	IX	XXIX-55	29	P3030	llc or llb	180707	15
2007/054	South	XXVII	LVII-53	10	P794	lla	200707	20
2007/055	North	IX	XXXX-55	31	P3031	llc or llb	200707	15
2007/056	South	XL	LVIII-54	7	P791	lla	190707	15
2007/057	South	XL	LVIII-54	8	P792	lla	190707	17
2007/058	South	XXVI	LIX-52	6	P793	lla	190707	13
2007/059	South	XL	LVIII-55	6	P796	lla	200707	16
2007/060	North	VII	XXXII-55	60	P3034	llc	230707	15
2007/061	North	IX	XXIX-55	33	P3032	?	240707	15
2007/062	North	VII	XXXII-55	61	P3035	llc	240707	5

Table 2 Plant taxa recorded in samples from excavations at Kaman-Kalehöyük in 2007 using the following scale of abundance:

* = rare; ** = occasional; *** = frequent; **** = abundant; ***** = very abundant

	Area	North	s	North	North	North	North
	Sector	V	V	V	XXXII	XXXII	XXXII
	Grid	XXXVII-54	XXXVII-55	XXXVI-54	XLIII-51	XLIII-50	Araduvar
	Context	85/H281	58	79/P2957	74/P2937	57/P2955	7/P2959
	Sample method	Flotation	Flotation	Flotation	Flotation	Flotation	Flotation
	Sample Size (L.)	14	0.2	36	37	50	42
	Flotation number	2006/012	2006/019	2006/059	2006/017	2006/056	2006/061
Sample composition	Kaman Phase	IIIc/IVa	IIIc/IVa	III c	II c	II c	II a
Wood		***	***	***	**	***	***
Cereal grain		**	****	**	*****	***	***
Composite material		**	***	**	**	**	*
Straw etc					***		**
Silicified/min matter					*****		*****
Cereal crops							
<i>Hordeum vulgare</i>	Grain	*	***	**	*****	*	*
<i>Hordeum vulgare</i>	Rachis segments						**
<i>Triticum aestivum or durum</i>	Grain	**	***	**	*****	***	***
<i>Triticum aestivum</i>	Rachis segments	*	***		**		**
<i>Triticum aestivum or durum</i>	Rachis segments				**		*
<i>Triticum</i> spp.	Grain						**
<i>Triticum monococcum</i>	Grain		***		**		**
<i>T. monococcum</i>	spikelet fork				*		
<i>T. dicoccum/T. monococcum</i>	spikelet fork				*		****
Cereal indeterminate	Grain	**	****	**	***	*	
Legume crops							
<i>Vicia ervilia</i>	Seed		**				*
Fruits							
<i>Ficus</i>	Mineralised seed	***					
Wild plants							
Apiaceae	Seed				***		
<i>Bolboschoenus maritimus</i>	Seed				**		
<i>Arnebia/Lithospermum</i>	Seed	***	****	*****	****	*****	***
Caryophyllaceae	Seed	**					*
Asteraceae	Seed					***	
Cruciferae	Seed	**					
Cyperaceae	Mineralised seed	*			**		
Cyperaceae	Seed				**		
<i>Eleocharis</i>	Seed				**		
<i>Galium</i> type	Seed		**		***	*	**
Gramineae (small types)	Seed	***	**		***		***
Gramineae (large types)	Seed		***				***
Leguminosae	Seed				*		
<i>Lolium</i>	Seed		**		**		***
<i>Polygonum</i> (trigonous form)	Seed						
<i>Potentilla</i>	Seed	*					
<i>Ranunculus arvensis</i>					*		
<i>Rumex</i>	Seed		**		**		
<i>Stipa</i>	Seed	*					
<i>Teucrium</i>	Seed				*		*
<i>Thymelea</i>	Seed				***		
Unidentified	Seed	**	**	***	***	***	****

