Jebel Khalid, Syria 2010: A preliminary report.

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Introduction

Archaeobotanical research was re-established in 2010 at the Hellenistic settlement of Jebel Khalid, Syria. Earlier research into plant use at the site has previously been undertaken by Andrew Fairbairn (A. Fairbairn, 'Jebel Khalid: The 2002 Season. Archaeobotany', *Meditarch* 16, 2003, 182-3), Andrew Fairbairn and Eleni Asouti (A. Fairbairn–E. Asouti, 'Evidence for olive wood and deforestation at Jebel Khalid', *Meditarch* 18, 2005, 190-1 and Amr Al-Azm (A. Al-Azm, 'Archaeobotanical and Environmental Studies at Jebel Khalid: Preliminary Report on the 2005 Season', *Meditarch* 18, 2006, 158-60). The aims of the 2010 season were to:

a) Design, construct and assemble a flotation machine with a water-recycling system;
b) Process via flotation the 2008 backlog of soil samples and 2010 samples;
c) Discuss and improve current sampling procedures;
d) Provide preliminary assessment of the light (flot) and heavy fractions from flotation.

This report summarises the results of the 2010 archaeobotanical field research season at Jebel Khalid.

Flotation Machine

The main method used to extract plant remains from soil samples is flotation. Flotation is based on the basic principle that when a soil sample is mixed with water the charred plant material will float and the heavy material and soil particles will sink (see D. Pearsall, *Paleoethnobotany: A handbook of procedures* [1989]). This principle has previously been used at the site to process samples via bucket flotation and a mini flotation machine (see Al-Azm, Fairbairn–Asouti, Fairbairn op.cit.). Machine flotation was established at Jebel Khalid during this season to provide a more efficient means of processing samples. The design of the main flotation tank was based roughly on Nesbitt's design (M. Nesbitt, 'Recovery of Archaeobotanical plant remains at Kaman-Kalehoyuk' in: H.I.H. Prince Takahito Mikasa (ed.), *Essays on Ancient Anatolia and its surrounding Civilisation* [1995] 115-30) with a few minor modifications. It was purpose-built using locally available materials including a 40-gallon oil drum that was welded and equipped with the appropriate fixtures. The purchase of a water pump was required to provide sufficient water pressure to process samples.

The processing area was set up close to the conservation laboratory in the village of Abu Qalqal. This location was found to be an appropriate area for the processing of soil samples as it has an accessible water resource. A water recycling system was additionally established in correlation with the construction of the main flotation tank to minimise water wastage. This was achieved by the simple addition of two extra oil drums of varying heights to act as settling tanks. The fine silts and clays from processed samples settled out in the bottom of the settling tanks, and needed only to be cleaned out periodically. The addition of settling tanks to the flotation system also meant that water could be reused numerous times through the system in order to conserve the local water supply that varies significantly in availability throughout the day. Acquiring a flotation machine for soil processing is a long term project investment. It will benefit the capacity of individuals to achieve a good yield of material from samples in an efficient manner in any future season. Furthermore, it can be easily moved, stored and has a long lifespan.

Flotation of 2008 sample backlog and 2010 samples

During this season 88 samples consisting of a total of 907 litres were processed. The samples had been collected from a range of excavation areas from the 2008 and 2010 seasons. While most samples processed came from Area S, other excavation areas including A, B, C and X were also sampled. The soil samples were collected from various contexts across the site including hearths, vessels, pits, ash deposits and floors. Prior to the processing of each sample, a small sub-sample of approximately 100

grams of soil was collected and stored for phytolith analysis to occur at a later date. Ninety-four phytolith samples were taken from the 2008 and 2010 samples. Six mud brick fragments were also sampled this season. All the samples backlogged from the previous excavation season as well as the current season were processed.

Sampling procedures

While the range of contexts sampled during the 2008 and 2010 excavation seasons at Jebel Khalid were sufficient, the volume of soil collected per sample had significantly declined from previous years. Most of the samples processed during the 2010 season ranged between 10-25 litres. Preferably archaeobotanical samples should attempt to range from between 50-60 litres per sample for future seasons. Having no backlog at the start of the next season will allow additional onsite communication with trench supervisors to help establish more uniform sampling practices and to continue to increase sample size wherever feasible.

Assessment of samples

All light fractions (flot material) were subjected to preliminary analysis in order to determine the general character of the assemblages. Few samples contained large quantities of charred material and only fourteen samples were noted as containing a significant quantity of such material. The preliminary analysis of samples identified a variety of economic and wild taxa. The two most common economic cereal plant types identified were six-row hulled barley *(Hordeum vulgare)* and free threshing wheats (*Triticum aestivum/durum*). This correlates with previous archaeobotanical studies at the site (see Al-Azm, Fairbairn– Asouti, Fairbairn op.cit.). Other economic plants including grape (*Vitis Vinifera*), lentils (*Lens culinaris*), olive (*Olea europaea)* and unidentified nut fragments were also noted. Grape pips were abundant in numerous samples. A variety of wild taxa common to dry land zones including the arable weeds *Arnebia/Lithospermum*, *Galium* type, *Leguminoseae* (small types) and a variety of wild grasses were also noted. The complete laboratory analysis of samples in correlation with continued on-site uniform sampling has the potential to increase the current understanding of the Hellenistic economy of the site and the agricultural history of plant use in northern Syria by providing a more comprehensive overview.

The presence of olive stones identified this season resulted from the complete sorting of the heavy fraction from all flotation samples. This may offer an explanation for the limited presence of olive seeds identified during previous years of processing. Several significant small finds were also identified while sorting through the heavy residue including stamped and diagnostic pottery sherds, beads, metal objects and animal bones. While very few archaeobotanical remains were present in the heavy fraction the presence of olive stones and other small artefacts that otherwise may have been overlooked, highlights the importance of sorting through this material from unsifted soil-samples in future seasons. The sorting of this material during the season also had the added advantage that only a minimal area of storage space was required at the end of the season.

Conclusion

This has been a very successful season with the renewal of archaeobotanical research at Jebel Khalid. The preliminary analysis of samples processed during the 2010 season substantiates a future for archaeobotanical research at this site. The acquisition of a flotation machine with a recycling system is a long-term investment for the project. It will provide individuals with all the paraphernalia required to process samples in an efficient manner during future excavation seasons. As sampling continues to increase at Jebel Khalid, the integration of future archaeobotanical analysis with historical, zooarchaeological and artefactual information will potentially provide additional details to our current understanding of the Hellenistic economy of the site and the agricultural history of northern Syria.