Supplemental Materials:

MATERIALS AND METHODS

A total of 28 sediment samples were analyzed for this study (Table 1). The samples were taken from a variety of well-preserved and clearly defined contexts, including brush hut floors, hearths and middens. Early recognition of the significance of the site facilitated a thorough sediment-sampling program. The samples examined for phytoliths were collected during the summer of 2012 from stored bulk sediments of varying volumes (from a few grams to liters) and 0.5 m x 0.5 m sediment blocks that were extracted from brush hut floors during excavation. These *in situ* sediments provided the opportunity to take pin-point samples from some of the most informative contexts.

Phytoliths were extracted from the sediments following Rosen’s ([1999](#_ENREF_10)) protocol, which employs a series of techniques to remove carbonates, clays and organics before extracting the phytoliths. First, the sediment was sieved though a 0.25 mm mesh to remove the coarse sediment fraction. A sub-sample of approximately 800 mg was weighed and taken for analysis. The sample was treated with 30 ml of 10% HCl to remove the carbonates. To disperse the clays, a solution of Sodium hexametaphosphate (lab grade Calgon and distilled water) was added to the sample. The clays were removed from the sample by decanting after settling the fine sands and silts in an eight cm column of water for one hour. This process was repeated until the suspense was clear. Organic matter was removed by dry ashing the samples in a muffle furnace for two hours at 500 degrees Celsius. The phytoliths were then extracted from the remaining fraction by heavy density separation with a Sodium polytungstate (SPT) and distilled water solution calibrated to 2.3 specific gravity to separate the phytoliths from the heavier minerals. The phytoliths were then poured off into a clean centrifuge tube, washed in distilled water, dried, weighed and then mounted in Entellan (Merck). The phytolith slides were counted at 400 x magnification using a transmitted-light microscope (Nikon Eclipse E200). A minimum of 300 single-cell forms and 50 multi-cell forms (whenever possible) were counted on each slide. The results are expressed as number per gram of sediment. The absolute counts (number per gm sediment) for each phytolith type were calculated using a modified method outlined by [Albert, et al. (1999](#_ENREF_2)); [Albert, et al. (2003](#_ENREF_1)), see [Power, et al. (2014](#_ENREF_6)) for details.

The phytoliths throughout the site appear to be well preserved with the presence of delicate morphotypes such as hairs, and some large multi-cell forms suggesting favorable preservation conditions (Figure 2a-g). The phytolith assemblage contains single-cell (SC) and multi-cell (MC) phytolith morphotypes for several plant types and parts, including: monocot leaves and stems, indicated by SC and MC psilate long cells; a variety of grass ‘husks’ (glume, lemma, and palea covering the grain), indicated by dendritic long cells, both SC and MC. By studying the anatomical orientation of MC forms, it is possible to make identifications down to the genus or species level with confidence levels ranging from 90%-60%. We were able to obtain high confidence identifications for wild wheat (*Triticum* sp.), however, high confidence identifications for the other wild cereal/grasses to genus or species were limited (Table 2). Although recently published work takes these identifications to a finer level ([Ball, et al. 2015](#_ENREF_3)), we were not able to evaluate this technique at the time of this current study. Hence, further work is in process to develop effective multi-cell identification protocols. As such, grass/cereal identifications in this paper are conservatively limited to cf. wild wheat husk, wild grass husk (large and small grained grasses) (Figure 2c, e), and cereal straw (Figure 2g) identified following Rosen ([1992](#_ENREF_8), [1993](#_ENREF_9)). SC monocot phytoliths are identified according to their anatomical designation ([Metcalf 1960](#_ENREF_5)) and the ICPN classification system, where possible ([Madella, et al. 2005](#_ENREF_4)). For further information regarding phytolith morphotype identifications see [Ramsey, et al. (2016](#_ENREF_7)) and S2 Table.

Albert, Rosa Maria, O Bar-Yosef, Liliane Meignen and Steve Weiner

2003 Quantitative phytolith study at hearths from the Natufian and Middle Paleolithic levels of Hayonim Cave (Galilee, Israel). *Journal of Archaeological Science* 30:461-480.

Albert, Rosa Maria, O Lavi, S Estroff, Steve Weiner, A Tsatskin, A Ronen and S Lev-Yadun

1999 Modes of occupation of Tabun Cave, Mt. Carmel, Israel during the Mousterian Period: a study of sediments and phytoliths. *Journal of Archaeological Science* 26:1249-1260.

Ball, T., K. Chandler-Ezell, R. Dickau, N. Duncan, T.C. Hart, J. Iriarte, C. Lentfer, A. Logan, H. Lu, Marco Madella, Deborah M. Pearsall, Dolores R. Piperno, Arlene Rosen, L. Vrydaghs, A.R. Weisskopf and J. Zhang

2015 Phytoliths as a tool for investigations of agricultural origins and dispersals around the world. *Journal of Archaeological Science*.

Madella, Marco, Anne Alexandre and T. Ball

2005 International code for phytolith nomenclature. *Annals of Botany* 96(2):253-260.

Metcalf, C.

1960 *Anatomy of the monocotyledons I. Gramineae*. Oxford University Press, London.

Power, Robert C., Arlene Rosen and Dani Nadel

2014 The Economic and Ritual Utilization of Plants at the Raqefet Cave Natufian site: The evidence from phytoliths. *Journal of Anthropological Archaeology* 33:49-65.

Ramsey, M.N., L.A. Maher, Danielle Macdonald and Arlene Rosen

2016 Risk, Reliability and Resilience: Phytolith Evidence for Alternative 'Neolithization' Pathways at Kharaneh IV in the Azraq Basin, Jordan. *PLOS ONE*.

Rosen, Arlene

1992 Preliminary identfication of silica skeletons from Near Eastern archaeological sites: an anatomical approach*.* In *Phytolith Systematics, Emerging Issues*, edited by G. J. Rapp and S. C. Mulholland, pp. 129-147. vol. Advances in Archaeological and Museum Science. Plenum Press, New York.

1993 Phytolith evidence for early cereal exploitation in the Levant*.* In *Current Research in Phytolith Analysis: Applications in Archaeology and Paleoecology*, edited by D. M. Pearsall and D. R. Piperno, pp. 160-171. University of Pennsylania, Philadelphia.

1999 *Phytolith Protocol*, Manuscript in posession of author.