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Plant-food preparation on two consecutive floors at Upper Paleolithic Ohalo II, Israel

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ABSTRACT

The Ohalo II Upper Paleolithic site was inundated for ca. 23,000 years. A unique and diverse assemblage of seeds and fruit was thus excellently preserved on its brush huts floors. Three successive floors were identified in Brush Hut 1; about 55,000 seeds and fruits were found on its lower floor, Floor III. Food preparation features were found on two of these floors: a hearth in the center of Floor III and a grinding stone in the north of Floor II. Here we analyze the spatial distribution of fourteen prominent plant taxa recovered from Floor III, and compare the results with previously published spatial distribution of the same taxa on Floor II. We describe here the plant remains' distribution around food preparation features – grinding stone (floor II) and a central hearth (floor III), and the groups of taxa which appear on both floors. The similarity in taxa as well as their concentrations on both floors indicates similar activities. We also raise the possibility that the two floors represent two different seasons of occupation – Floor III in winter and Floor II in summer.

1. Introduction

The lifestyles of ancient societies can be reconstructed by a multi-disciplinary approach combining, for example, the analysis of tools, animal bones, and plant remains. However, knowledge of the site's structure and its preservation following abandonment is essential for this task. The remains' spatial distributions may reflect how a society functioned, in particular activity areas (Balme and Beck, 2002; Hayden, 1997), but only when they are found in situ (Goldberg, 2000; Goldberg and Bar-Yosef, 1998). Charred plant remains such as seeds are usually light and vulnerable to a wide variety of depositional and post-depositional processes. Only in rare cases were the remains preserved in situ and in large enough quantities to permit for spatial analyses (Alperson-Afil et al., 2009).

One such case is the late Upper Paleolithic site of Ohalo II, Israel (Fig. 1). This camp site was widely excavated and the main elements include six brush huts, several open-air hearth concentrations, and a grave. The brush hut floors were dug into the Lisan Formation, on the shore of a fluctuating lake. The site was radiocarbon dated to 22,500–23,500 cal B.P. (Nadel et al., 1995, 2002).

Brush Hut 1, the largest and best preserved hut, had three successive floors (Fig. 2). The upper floor was only partially preserved, but Floors II and III were discovered intact. Floors II and III were covered by sediments after its use, which sealed them from disturbance (Nadel et al., 1995, 2002).

Weiss et al. (2008) found that food preparation on Floor II of Brush Hut 1 was concentrated on its northern side. This was indicated by the presence of a grinding stone set firmly on its floor, with cereal seeds forming a distinct non-random pattern around it. Cereal starch grains were retrieved from the upper face of the stone but were rare on the lower face and the adjacent sediments, indicating that it was used for cereal seed grinding (Piperno et al., 2004; Nadel et al., 2012).

Our previous report (Weiss et al., 2008) describes and interprets the distribution of almost 60,000 identified seeds and other plant remains on Floor II's 12 m^2. The study reconstructed three activity areas in the hut's interior: a food and possibly medicinal plant processing area centered around a grinding stone in the north; a flint knapping locale in the south; and an access area between the two (Piperno et al., 2004; Nadel et al., 2012). Floor III, located below Floor II, is the earliest of the three floors. This floor is covered by a grass bedding containing bunches of partially charred *Puccinellia* cf. *convoluta* stems and leaves (Fig. 3), which were arranged around the central hearth (Nadel et al., 2004). Most of the plant remains of Floor III were found in the sediment above the grass bedding.

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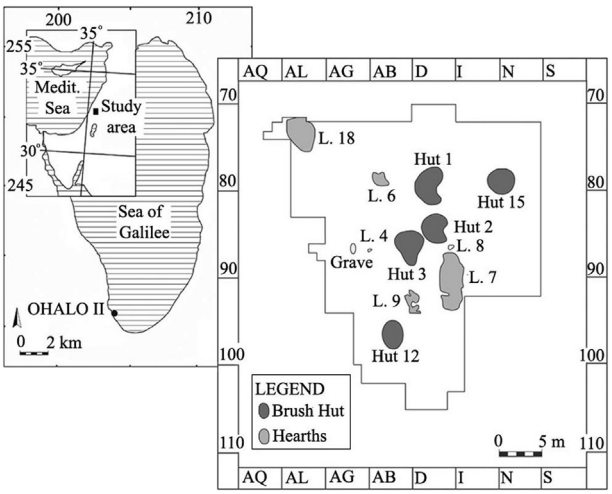

Fig. 1. Location map of Ohalo II and central area of excavation at the site.

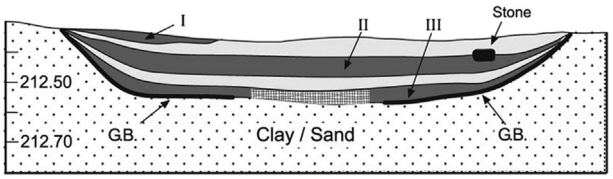

Fig. 2. A north-south cross-section through the floors of brush hut 1. Note the exaggerated vertical scale. I, II, III, indicate the three floors, the grinding stone on right is discussed in text; GB = grass bedding.

This work presents the spatial distribution of 45,606 charred seeds and fruits on Floor III out of a total of 55,000 that were found on it, as well as comparing this to the 52,323 out of 57,811 plant remains found on Floor II (taxa without adequate number of finds across the entire floor area were omitted, see below). These finds illuminate the differences between the two phases of floor use and food preparation. The new results indicate that Floor II users were fully aware of the location of the earlier hut over Floor III (Fig. 4). In addition, we found several correlations between the plant distribution mappings of the two floors. We will discuss these results below.

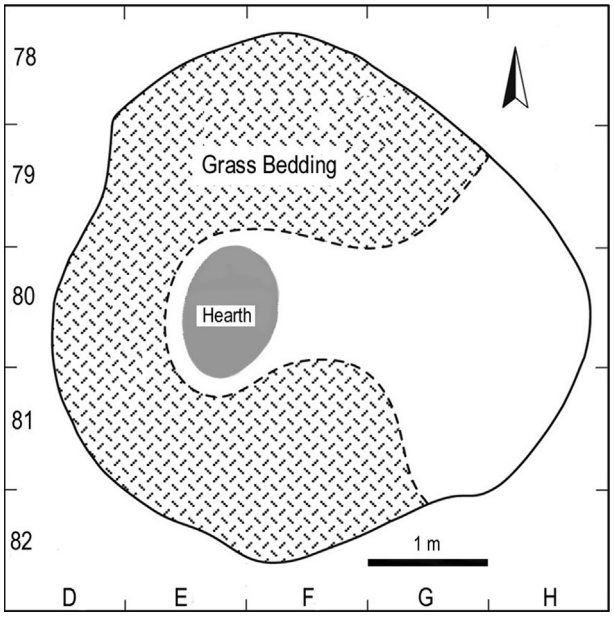

Fig. 3. Floor III, the hearth in the center and the grass bedding around it.

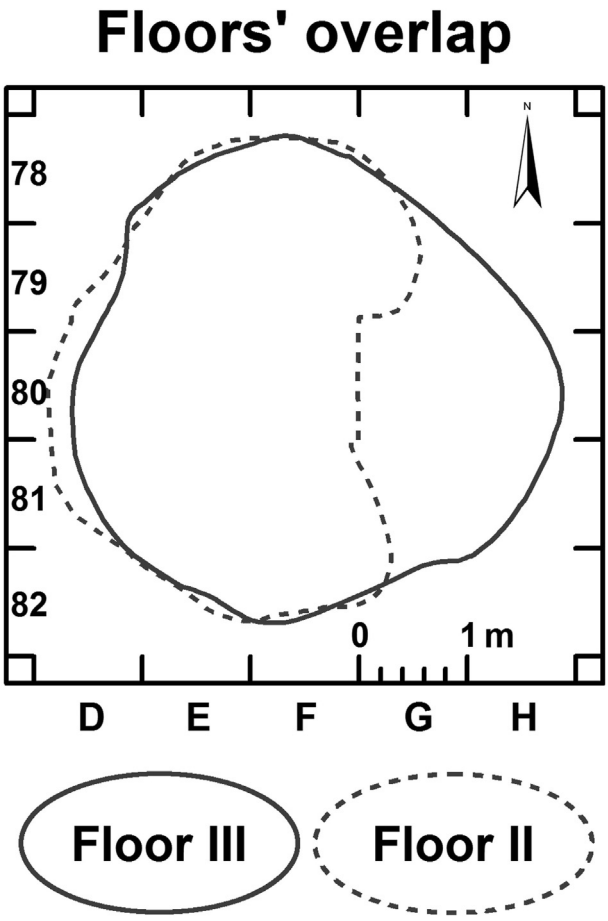

Fig. 4. Outlines of the two overlapping floors, Floor II is above Floor III.

2. Materials and methods

2.1. The site of Ohalo II

Ohalo II is located on the southwestern shore of the Sea of Galilee, Israel. The site was inhabited and then inundated ~23,000 years ago, during the Last Glacial Maximum (LGM) (Nadel et al., 2004). It was discovered in 1989 when the lake water level dropped drastically to ~213.8 m below mean sea level (MSL) following several years of drought and water pumping. The submerged site is exceptionally well-preserved. The remains of six brush huts were identified during fieldwork, in addition to several hearths concentrated around them (Fig. 1). Four of the brush huts were fully excavated and two were largely sampled. All of these huts had a bowl-like cross section, indicating that the inhabitants made shallow depressions in the soft bedrock before their construction. Four huts were oval in general shape, while two were kidney-shaped.

The plant species used for hut construction were identified as the following species. Brush Hut 1, the largest hut, was made from thick branches of *Tamarix* (tamarisk), *Salix* (willow) and *Quercus ithaburensis* (oak), covered by smaller branches of species such as *Atriplex*/*Seidlitzia* (orach/seidlitzia) and *Prosopis* (mesquite), as well