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SOUTHERN PALESTINIAN CHRONOLOGY: TWO RADIOCARBON DATES FOR THE EARLY BRONZE AGE AT TELL EL-HESI (ISRAEL)

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ABSTRACT. Several articles reporting radiocarbon dates of Early Bronze Age (EB) material from excavations in the southern Levant have been published over the last 30 yr. The excavations conducted at Tell el-Hesi have produced material from which 2 additional ^{14}C dates have been extracted to date. The 2 samples confirm the EB dating of Field VI material and suggest EB III settlement at Hesi might be earlier than previously reported based on pottery typology.

INTRODUCTION

Radiocarbon dates of material culture found at Near Eastern archaeological sites, especially those in the southern Palestinian or Levantine area (Figure 1), have been gathered in several articles spanning almost 30 yr. The ^{14}C dates cover remains from several prehistoric and historic periods. Each of the dates adds to the corpus of material that will enable a broader reconstruction of the history of the periods and a stronger correlation between ceramic stratigraphic analysis and dating. This particular report adds to the corpus of Early Bronze Age (EB) dates, especially EB III.

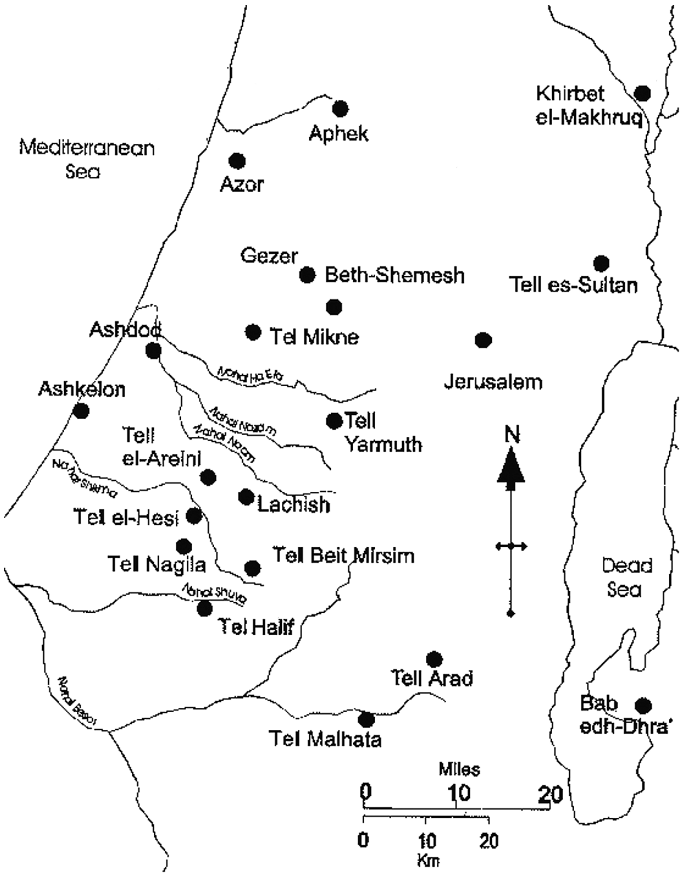

Figure 1 Some Early Bronze Age sites in southern Palestine

The Early Bronze Age in Palestinian archaeological studies is a period of uncertain duration, but often is considered to cover the period from ~3500 to 2200 BCE (see e.g. Ahlström 1993; Rast 1992). The EB is usually divided into 3 periods with approximate ranges of EB I (3500–2900 BCE), EB II (2900–2600 BCE), and EB III (2600–2200 BCE). A period frequently termed EB IV–MB I (2200–1800 BCE) is usually viewed as a transition from the EB to the Middle Bronze Age (MB). These generally accepted divisions of the EB are often put forth as progressive stages in this period of urban development.

Table 1 summarizes 8 articles listing ^{14}C dates for material culture uncovered at Palestinian sites. Each article presents the dates of ^{14}C analyses differently; some of the early articles and dates are derived from what are now considered to be less than accurate procedures. Also, some of the articles do not separate the results into the different EB periods, and some do not separate results into any archaeological period. The articles often present sites and ^{14}C results detailed in previous articles. Sometimes several samples have been analyzed from the same archaeological site and occasionally from various areas of the site and submitted in different years. The articles list 33 different sites for Palestine, including the Negev, and the dates of approximately 204 different samples. Following the general formulation of EB dates mentioned above, Table 1 summarizes these 8 articles that have published ^{14}C dates for EB Palestine.

Table 1 Summary of articles listing Early Bronze Age ^{14}C dates. All dates are BCE.

Authors	EB I	EB II	EB III
Callaway and Weinstein 1977	5 sites 19 samples range: 4030–2920	3 sites 24 samples range: 3679–2620	4 sites 12 samples range: 3340–2520
Weinstein 1984	6 sites 25 samples range: 5480–2795	5 sites 36 samples range: 3810–2535	5 sites 30 samples range: 3900–2305
Stager 1992	5 sites 12 samples range: 5480–2930	4 sites 42 samples range: 3955–2545	3 sites 21 samples range: 3955–1855
Housley 1994	1 site 2 samples range: 5270–4590	1 site 6 samples range: 4580–4140	1 site 2 samples range: 4130–4100
Avner et al. 1994	4 sites 10 samples range: 3690–3028	7 sites 19 samples range: 3093–2355	8 sites 13 samples range: 2633–1763
Avner and Carmi 2001	5 sites 16 samples range: 3520–2700	9 sites 16 samples range: 2920–2300	10 sites 17 samples range: 2630–2200
Bruins and van der Plicht 2001	1 site 4 samples range: 3370–3030	1 site 3 samples range: 3020–2900	1 site 1 sample range: 2890–2700
Golani and Segal 2002	1 site 17 samples range: 4081–3042		

It is not the intention of this article to analyze all the dates, but rather to add 2 dates from the Hesi samples to the corpus of ^{14}C dates for EB Palestine. The purpose of this paper is to provide additional evidence to the ^{14}C corpus for dating EB cities and cultural remains in the southern Levant.

Site Background and Context

Tell el-Hesi is located 23 km from the Mediterranean and 26 km east-northeast of Gaza (31°32′N, 34°43′E, or 124106 on the Israeli grid system). First excavated in 1890 by Sir William Mathew Flinders Petrie and in 1891 by Frederick Jones Bliss, current excavations began in 1969 organized by George Ernest Wright (Dahlberg and O'Connell 1989). Excavations on the southern part of the tell began in 1975 where a large EB portion of the city lay under a Muslim cemetery (Eakins 1993).

During the 1979 field season in Field VI, a significant number of seeds were discovered in an ash dump outside the city wall (Figure 2). The ash dump extended from VI.42 through VI.52 and was over 2 m deep (O'Connell and Rose 1980). Pockets of ash were discovered in other areas as well, but the large dump along the exterior wall was sampled since it was quite deep and was likely to contain fewer intrusions than other places where ash was discovered. The extent of the ash dump was approximately 6 m wide along the face of the outside wall and about 6 m away from the wall going to the south and diminishing in depth the further away from the wall the ash was dumped. The pottery dated to the EB throughout the ash level, with the exception of the uppermost level that was a disturbed area, probably due to weathering, intrusions by agriculturalists from several periods, early 19th century Bedouin burials, and 20th century military activities.

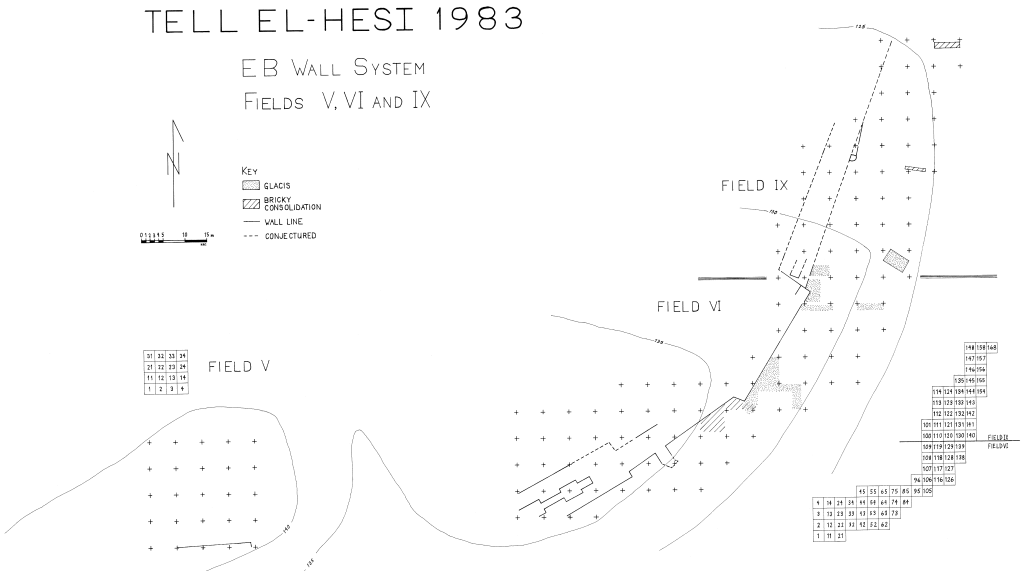

Figure 2 Early Bronze Age in fields V, VI, and IX

Two charred emmer seed samples collected from this ash level were sent to Beta Analytic Inc. (Beta) for ^{14}C analysis. One sample was slightly above the bottom of a 2-m-high ash layer in VI.52, above a hard-packed surface in a dung layer; the other sample was on the bottom level of VI. 42, on the walking surface along the wall and buttress (O'Connell and Rose 1980). Both samples were collected in guffas and taken to a botanist for flotation and analysis. The seeds used in these samples were collected during the flotation process of ash material (Stewart and Robertson 1973; see also Stewart and Robertson 1971).

RESULTS

The results provided by Beta were detailed in printed reports. The analysis was made using accelerator mass spectrometry (AMS) standard delivery following a full pretreatment of acid/alkali/acid. Beta calculated ^{14}C age and calendar calibration following *Radiocarbon* Vol. 40, No. 3 (1998) calibration data and the Pretoria calibration procedure. The reports include 1- and 2-σ dates. The Beta number appears first followed by the Hesi material cultural registry (MCR) number.

1. Beta-147501. Tell el-Hesi 12146 **4170 ± 50 BP**

Carbonized emmer seeds found in ash deposit outside of mud-brick wall system ~1.1 m below the surface; several thousand seeds found in the ash layer against the wall; sample from Field VI Area 42 locus 021. The Hesi MCR number is 12146. The sample was collected in 1979 by the author on the walking surface next to the outer city wall and buttress in a dung lens on the surface over barren soil.

Comment: Beta reports the measured ^{14}C age as 4110 ± 50 BP. The 1-σ calibrated dates of 2880–2830 BC and 2830–2650 BC and 2-σ dates of 2890–2590 BC are reported by Beta. These dates provide a correlation with EB III pottery horizon for the southern Levant indicating occupation of Tell el-Hesi during this period.

2. Beta-147502. Tell el-Hesi 13611 **4200 ± 50 BP**

Carbonized emmer seeds found in ash deposit outside of mud-brick wall system 1.8 m below the surface; several thousand seeds found in the ash layer; sample from Field VI Area 52 locus 010.3. The Hesi MCR number is 13611. The sample was collected in 1979 by the author on the bottom of an ash fill against the outside city wall above a hard-packed surface in a dung lens.

Comment: Beta reports the measured ^{14}C age as 4150 ± 50 BP. The 1-σ calibrated dates of 2890–2860 BC and 2810–2690 BC and 2-σ dates of 2900–2620 BC are reported by Beta. These dates provide correlation with the EB III pottery horizon for the southern Levant for occupation of Hesi during this period. The results are summarized in Table 2.

Table 2 Summary of Beta Analytic reports.

Beta-47501	Beta-47502
Description: carbonized emmer seeds	Description: carbonized emmer seeds
^{14}C age: 4170 ± 50	^{14}C age: 4200 ± 50
Calibration data set: intcal04.14c[a]	Calibration data set: intcal04.14c[a]
1-σ ranges: [start:end] relative area	1-σ ranges: [start:end] relative area
[2877 BC:2847 BC] 0.181105	[2892 BC:2852 BC] 0.285065
[2844 BC:2840 BC] 0.015803	[2812 BC:2744 BC] 0.523043
[2813 BC:2692 BC] 0.738347	[2726 BC:2696 BC] 0.191892
[2689 BC:2678 BC] 0.064745	
2-σ ranges: [start:end] relative area	2-σ ranges: [start:end] relative area
[2890 BC:2619 BC] 0.989064	[2903 BC:2831 BC] 0.28101
[2606 BC:2600 BC] 0.007253	[2821 BC:2630 BC] 0.71899
[2592 BC:2589 BC] 0.003683	

[a]Reimer et al. 2004.

DISCUSSION AND CONCLUSION

Pottery typology has been the main indicator of chronology at Syro-Palestinian sites since Petrie (1891) and Bliss (1898) (see also Amiran 1970; Dever 1997). The first site for defining this typology as a ceramic sequence was Tell el-Hesi where Petrie began his work and Bliss continued (Herr 2002). The EB pottery found by Petrie and Bliss was an important indicator of early cultures at the site. Subsequent excavations at the site (Toombs 1990) have encountered additional EB pottery and occupation levels. The pottery chronology tradition at Tell el-Hesi continues to be studied and described by Fargo (1979), Seger (1989), and de Miroschedji (2000), reiterating chronological arguments based on an established ceramic typology for EB forms (Amiran 1970; Herr 2002).

Pierre de Miroschedji (2000) mentions that the EB assemblage at Tell el-Hesi appears to be similar to the EB IIIA period (~2600 BCE) at Yarmuth, although "the most typical pottery published from the early excavations of Petrie in 1890 and Bliss in 1891–92 testify to an EB III B–C occupation on the main mound" (de Miroschedji 2000:336). This conclusion is indeed the case, but the pottery from Field VI is not from the main acropolis and is considered to exemplify an earlier date for the EB. Hesi staff (Rose and Toombs 1976; O'Connell et al. 1978; O'Connell and Rose 1980; Toombs 1983; Doermann and Fargo 1985) have previously provided preliminary discussions of EB remains. Additional analyses and specialized studies continue to be made by Hesi staff towards a more complete presentation of the EB material that will include pottery typologies and other analyses of remains.

Preliminary discussion has suggested that EB occupation at Hesi occurred in the middle to end of the EB III period (Toombs 1983). The ^{14}C seed samples suggest that EB settlement at Hesi might have occurred at the beginning of the EB III period or even earlier and not in the middle or end of the period. A revision in dating EB settlement at Hesi also might have ramifications for other EB sites in the region with similar ceramic repertoires. Similarly, an analysis of EB Jericho samples by Bruins and van der Plicht (2001) reports dates that are earlier than those posited by Kenyon based on pottery analysis.

The 2 samples sent from the Tell el-Hesi staff to Beta provide part of the additional analyses needed to confirm the EB occupation dates at Hesi. The dates of the 2 samples as calibrated by Beta are 2890–2590 and 2900–2620 BCE. These dates confirm the EB III period for the pottery from Field VI and also possibly indicate an earlier date for settlement for Field VI than from the main acropolis at the larger mound (Fields I and III) as suggested by de Miroschedji. Further analyses might be able to provide additional information and help in determining if the "traditional" dates for EB III might need to be revised (Braun 2001).

For the moment, the ^{14}C dates for these 2 samples confirm the EB dates for occupation in the lower city at Tell el-Hesi. These dates also provide additional clues about the pottery chronology for southern Levantine pottery and interconnections in the immediate region (Avner et al. 1994; Phillips 1994) and the larger area (Smith 1965; Hennessy 1967; Esse 1991).

The EB ^{14}C dates from southern Palestine provide material for a historical reconstruction of the period. However, the use of ^{14}C dates as "yardsticks" (van der Plicht and Bruins 2001) and a "unifying" foundation (Bruins 2001) must be used with caution since laboratory errors (Mazar 2004) and length of standard deviations (Burton and Levy 2001) are concerns for evaluating the accuracy of the ^{14}C dating processes and results. Yet, the growing number of ^{14}C dates for adjacent areas, such as the Negev and Sinai, provide additional material for historical reconstruction. The new evidence from Tell el-Hesi provides further data building a broader and more solid base for such a reconstruc-

tion. The ^{14}C dates from Hesi and Jericho (Bruins and van der Plicht 2001) also suggest that the pottery chronology dates for EB III, and possibly for the entire Early Bronze Age, in the southern Levant might need to be revised to reflect earlier dates than are usually presented.

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