Chapter 4 Radiocarbon Dating

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I. Radiocarbon Dates from Tell Abu al-Kharaz

Introduction

Forty radiocarbon dates from the Iron Age Phases IX–XIV from Tell Abu al-Kharaz were obtained with the AMS (Accelerator Mass Spectrometry) technique at the VERA (Vienna Environmental Research Accelerator) laboratory. Two other dates were provided by ORAU (Oxford Radiocarbon Accelerator Unit).

In order to avoid a time offset between the date of the individual layer/event and the calibrated ^{14}C date of the ^{14}C sample, short-lived plant material, e.g. seeds, was preferred for dating. In cases where seeds were not available and charcoal had to be used instead, the charcoal samples were inspected by the archaeologist and only those originating from twigs were selected for ^{14}C dating.

Material

The ^{14}C samples from the cultural Phases IX to XIV (Table 75A) originate from three different areas at Tell Abu al-Kharaz, viz. Areas 3, 7 and 9 (see Fig. 9). The origin of the individual samples and their assignment to the different cultural phases are described below.

Phase IX

Area 9 East: A thick debris of burnt charcoal and mudbricks covered one of the best preserved compounds ever excavated at Tell Abu al-Kharaz: the walls of 21 exposed rooms (state autumn 2012) were preserved up to a height of 2.5 m. The noticeable remains of combustion may be the result of a hostile attack or an earthquake. In either case, we know that the inhabitants were not able or did not want to return to the city after the catastrophe to search through the collapsed remains for valuable goods, because all the finds were *in situ* and there are no signs whatsoever of later disturbances. Hundreds of complete objects were unearthed from this compound. It is therefore evident that all the samples are from the same period, i.e. the period prior to the catastrophe. Therefore dating of the short-lived samples should yield a very close *terminus post quem* for the conflagration. The samples were taken during the excavations in 2009 and 2010.

The following samples are all from the floors of this compound and consist of short-lived botanical remains, such as seeds of barley and millet, chickpeas, and twigs: VERA-5268 / VERA-5268HS, VERA-5266HS / VERA-5266HS2, VERA-5267HS, VERA-5544HS, VERA-5545 / VERA-5545HS, VERA-5546 / VERA-5546HS, VERA-5550 / VERA-5550HS, VERA-5547HS, and VERA-5548 / VERA-5548HS. The suffix "HS" in the VERA-laboratory number of the sample indicates that the dated material consisted of humic acids.

Area 7: Another sample which is ascribed to Phase IX, VERA-5078HS, originates from the easternmost part of Area 7 close to the city wall (twigs from the 2008 season of excavation). It should be noted that there is no stratigraphic connection with Area 9 (see Fig. 9).

Phase X

Area 9: Two samples, both twigs, come from the occupation succeeding the catastrophe layer of Phase IX: VERA-5270HS and VERA-5271HS, both from the excavations in 2010.

It is difficult to assess, from the find material alone, whether Phase X succeeded Phase IX fairly soon after the collapse of the compound or whether there was a time delay between the catastrophe and the new settlement. Judging from the undisturbed catastrophe layer of Phase IX it is, however, most plausible that there was a time delay: weather and wind might have created a fairly flat "blanket" which covered most of the remains of Phase IX and the new settlers built directly on this flat surface. It should also be highlighted that Phases X and XI can only be distinguished in the eastern part of Area 9 whereas the structures of the western part were in use unchanged throughout Phases X and XI. Consequently, these two phases are relatively close in time.

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Phase XI

Area 9: There is one sample of olive stones from Area 9 East: VERA-5543HS (Phase XI, 2010).

Area 7: There are two dates of a sample of twigs from this area, which is quite remote from Area 9: VERA-5081 / VERA-5081HS (2008).

Area 3: The sample consists of charred bone from a tomb to the north-west of Area 9: OxA-4377 (1992).

Phase XII

Area 3: A sample of twigs derives from the floor of the room where the remarkable "Sphinx handle" was found: VERA-1412 (1998).

Phase XIII

Area 7: All samples originate from the western part of Area 7 and from the same year of excavation (2009): VERA-5284HS (seeds from vessel), VERA-5282HS (seeds), VERA-5283HS (seeds from floor), VERA-5275HS (twigs from same space as VERA-5283HS), VERA-5277 / VERA-5277HS (charred material from ash of oven), and VERA-5278HS (seeds from same space as VERA-5277).

Phase XIV

Area 7: There are two groups of samples. One group consists of samples from twigs from the workshop in the easternmost part of Area 7 (2008): VERA-5073 / VERA-5073HS (twigs), VERA-5074HS, VERA-5069 / VERA-5069HS, VERA-5070 / VERA-5070HS, VERA-5075HS, VERA-5076HS; and the other group of samples of twigs is from a domestic building in the westernmost part of Area 7 (2009): VERA-5279 / VERA-5279HS, and from the central part of Area 7, twigs from the floor of a domestic building, OxA-5088 (1993).

Method

At the VERA laboratory the samples were chemically pre-treated with the ABA (acid-base-acid) method. In most cases the laboratory's standard ABA procedure, frequently used for archaeological samples, was applied (see e.g. Wild *et al.* 2008). The pre-treated samples were combusted in sealed quartz tubes containing CuO (and some silver wire) to convert the carbon of the samples into CO_2. Then the CO_2 was graphitised by the method adapted by J. Vogel (see Wild *et al.* 2008, Vogel *et al.* 1984) for the production of AMS ^{14}C targets. The ^{14}C determinations of the targets were performed with the VERA AMS system following the protocol for ^{14}C measurements of archaeological samples described in Steier *et al.* 2004.

Unfortunately ~50 % of the submitted samples dissolved completely during the NaOH step of the ABA pre-treatment. For these samples the humic acids were precipitated by acidifying the alkaline solution with HCl. After washing with bi-distilled H_2O the precipitate was dried and used as dating material.

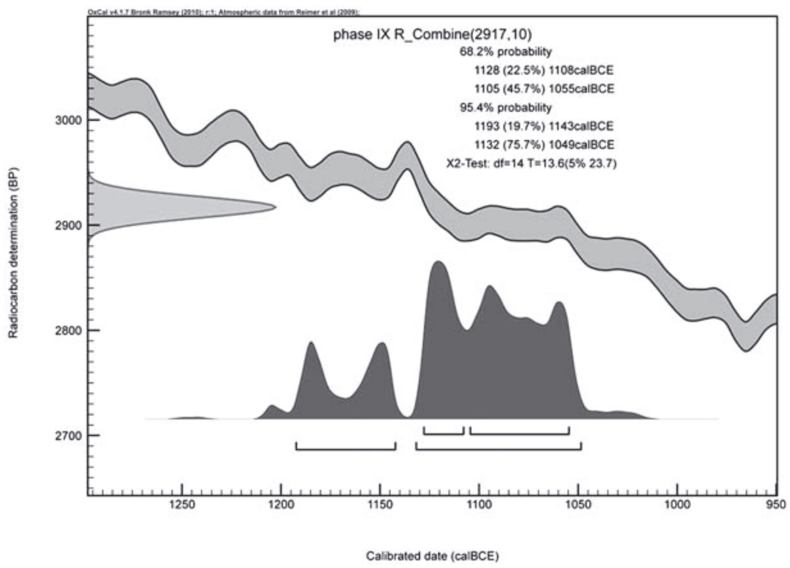
Usually the humic acid fraction of radiocarbon samples is avoided in ^{14}C dating, because it is assumed that this fraction could be contaminated with humic acids which have been transported by groundwater from other layers of a sediment profile to the sample. Therefore the ^{14}C content of carbon from the transported humic acid fraction may be divergent from that of the sample (see e.g. Alon *et al.* 2002). Triggered by the experience that many Bronze and Iron Age samples from the Middle East region did not survive the entire ABA pre-treatment and the fact that the ^{14}C data from humic acids yielded dating results in agreement with the archaeological expectations, a comparison of the dating results from fully ABA-treated samples and the dates yielded by the humic acid fraction extracted from these samples has been performed, whenever possible, over the last few years. The results of this study (see Wild *et al.* 2013) showed that for the ~ 50 samples from the investigated Middle Eastern sites the humic acid fraction and the regularly dated residue after the ABA treatment agreed within uncertainties. In the ABA/ humic acids study 13 samples from Tell Abu al-Kharaz were also included. The results demonstrate the reliability of the ^{14}C ages derived solely by humic acid dating.

Results and discussion

Table 75A lists the uncalibrated ^{14}C ages of the investigated samples from Tell Abu al-Kharaz together with the corresponding calendar time periods resulting from the calibration of the ^{14}C dates with the calibration program OxCal version 3.10 or 4.1. (e.g. Bronk Ramsey 1995 and 2001) and the calibration curve IntCal09 (Reimer *et al.* 2009).

The Phase IX samples from Area 9 East are ascribed to a single destruction event and a mean value was calculated from the 15 available ^{14}C data[89] with the R_combine option of OxCal, which also provides a χ^2 test of the data set. The result of the χ^2 test

[89] It should be noted that, although the ^{14}C ages are not normally distributed, for young sample ages (<30 kyrs) a normal distribution of the ^{14}C ages may be assumed (see e.g. Ward and Wilson 1978).



Plot 1: Calibration plot of the combined ^{14}C data from Phase IX, Area 9 East, generated with OxCal4.1. The calculated mean value, the calendar time ranges with their respective probabilities and the result of the χ^2 test are displayed in the plot.

does not contradict the assumption that the ^{14}C data are normally distributed and supports the archaeological assignment of the samples to the single event (see Plot 1). The combined data yield a very precise ^{14}C age of 2917 +/- 10 ^{14}C yrs BP. Unfortunately the calibration curve in the relevant time period is rather flat and also exhibits some wiggles. Therefore the high precision of the uncalibrated ^{14}C age does not translate into a similar precision of the calendar time period. If we argue on the basis of the usual 95.4 % probability (the true date falls with a probability of 95.4 % into a certain time period), which corresponds to the probability of the $\pm 2\sigma$ interval in the Gaussian distribution, we cannot exclude the time range between 1193 BCE and 1143 BCE – the probability, however, is only 19.7 %. Therefore – ignoring an 11-year period with a lower probability – we conclude that the Phase IX destruction event must have occurred between 1193 BCE and 1049 BCE. If we reduce the probability to 68.2 % (corresponding to a $\pm 1\sigma$ interval in the Gaussian distribution) the time frame for this event is narrowed to the time span between 1128 BCE and 1055 BCE.

A further reduction of the calendar time ranges of calibrated ^{14}C dates would be possible with Bayesian sequencing, which also utilises archaeological information in addition to the ^{14}C data. From an undisturbed sequence of archaeological layers the positions of the sample in the sequence give a relative chronology, telling whether a sample is coeval with other samples, or younger or older. A prerequisite for achieving accurate and precise calendar ages with the Bayesian method is that the archaeological layers are undisturbed. Further undetected gaps and gaps of unknown duration in a sequence are disadvantageous for the construction of an accurate model. At Tell Abu al-Kharaz the sequence excavated and dated so far probably has some minor gaps and therefore at the moment it is not possible to obtain a model with agreement indices (A_{model} and $A_{overall}$) of >60 % as recommended by Bronk Ramsey (2009).

Inspecting the unsequenced calibrated dates of Phases IX to XII reveals that the ^{14}C dates follow roughly the sequence of the phases. Nevertheless, it is also obvious that some scatter of the dates occurs in Phase XI, where the twigs from Area 7 yielded a significantly younger age than the olive stone from Area 9.

From Phase XII on, the calibration of the ^{14}C data produces already broad time ranges which are caused by the well known *Hallstatt plateau* in the calibration curve. Considering the calendar date of 732 BCE, the well-documented conquest of the area by the Neo-Assyrian empire, as a *terminus ante quem* for the end of Phase XIV, it was at least possible to calculate for the Phases XII to XIV a short Bayesian sequence. After the removal of two dates with low agreement indices from Phase XIII (VERA-5282HS and VERA-5275HS) from the model an overall agreement index of ~90 % was achieved.

Although very preliminary, this sequence pins down the transition from Phase XIII to XIV in the time span from 787BCE to 759BCE (95.4 % probability).

In the future we will try to improve and extend the model for sequencing for a larger time period.

Lab. No.	Material	Area/ Locus	δ13C (‰)	14C BP	Calibrated 2σ			Phase
VERA-5266HS	twigs	9/160	-27.6±1.0	2890±40	1220BCE	(92.6%)	970BCE	IX
					960BCE	(2.8%)	930BCE	
VERA-5266HS_2	twigs	9/160	-29.0±1.0	2880±40	1210BCE	(95.4%)	920BCE	IX
VERA-5267HS	grain-twigs	9/160	-24.9±1.1	2925±40	1270BCE	(95.4%)	1000BCE	IX
VERA-5268	twigs	9/160	-25.4±1.2	2940±40	1270BCE	(95.4%)	1010BCE	IX
VERA-5268HS	twigs	9/160	-29.6±1.8	2865±40	1200BCE	(95.4%)	910BCE	IX
VERA-5544HS	twigs	9/208	-23.5±1.5	2900±35	1260BCE	(1.7%)	1230BCE	IX
					1220BCE	(93.7%)	970BCE	
VERA-5545	twigs	9/219	-26.8±2.8	2855±35	1130BCE	(95.4%)	910BCE	IX
VERA-5545HS	twigs	9/219	-17.9±1.8	2955±35	1300BCE	(95.4%)	1040BCE	IX
VERA-5546	chickpeas	9/237	-24.5±1.9	2920±35	1260BCE	(5.5%)	1230BCE	IX
					1220BCE	(89.9%)	1000BCE	
VERA-5546HS	chickpeas	9/237	-22.3±1.3	2920±35	1260BCE	(5.5%)	1230BCE	IX
					1220BCE	(89.9%)	1000BCE	
VERA- 5550	millet	9/267	-7.2±1.7	2985±40	1380BCE	(95.4%)	1050BCE	IX
VERA-5550HS	millet	9/267	-6.4±1.7	2915±35	1260BCE	(4.3%)	1230BCE	IX
					1220BCE	(91.1%)	1000BCE	
VERA-5547HS	seeds-twigs	9/239	-26.0±0.8	2960±35	1310BCE	(95.4%)	1050BCE	IX
VERA-5548	grain	9/244	-25.9±1.1	2940±35	1270BCE	(95.4%)	1020BCE	IX
VERA-5548HS	grain	9/244	-26.7±1.1	2895±35	1220BCE	(95.4%)	970BCE	IX
VERA-5078HS	twigs	7/38	-25.7±0.6	2875±40	1210BCE	(95.4%)	920BCE	IX
VERA-5270HS	twigs	9/164	-26.9±0.7	2880±35	1210BCE	(95.4%)	930BCE	X
VERA-5271HS	twigs	9/165	-28.2±2.9	2800±35	1050BCE	(95.4%)	840BCE	X
VERA-5543HS	olive stones	9/176	-30.1±0.9	2930±35	1260BCE	(95.4%)	1010BCE	XI
VERA-5081	twigs	7/39	-26.9±0.6	2710±35	920BCE	(95.4%)	800BCE	XI
VERA-5081HS	twigs	7/39	-26.7±0.6	2725±40	980BCE	(2.9%)	950BCE	XI
					940BCE	(92.5%)	800BCE	
OxA-4377	charred bone (tomb)	3/93	-22.1	2910±65	1296BCE	(0.01)	1286BCE	XI
					1267BCE	(0.99)	911BCE	
					1201BCE	(0.09)	1179BCE	
					1166BCE	(0.91)	998BCE	
VERA-1412	twigs	3/365	-27.0±0.8	2535±30	800BCE	(28.6%)	750BCE	XII
					720BCE	(66.8%)	540BCE	
VERA-5284HS	seeds	7/515	-28.0±1.2	2515±40	800BCE	(95.4%)	500BCE	XIII
VERA-5282HS	seeds	7/505	-25.2±1.5	2685±35	910BCE	(95.4%)	790BCE	XIII
VERA-5283HS	seeds	7/507	-23.0±1.5	2515±35	800BCE	(95.4%)	520BCE	XIII
VERA-5275HS	twigs	7/432	-25.8±0.7	2475±35	770BCE	(87.3%)	480BCE	XIII
					470BCE	(8.1%)	410BCE	
VERA-5277	ash from oven	7/452	-26.7±1.2	2565±20	810BCE	(83.9%)	750BCE	XIII
					690BCE	(10.4%)	660BCE	
					610BCE	(1.0%)	590BCE	
VERA-5277HS	ash from oven	7/452	-27.7±0.9	2575±25	810BCE	(84.7%)	750BCE	XIII
					690BCE	(8.9%)	660BCE	
					610BCE	(1.8%)	590BCE	
VERA-5278HS	seeds	7/469	-27.5±1.3	2575±25	810BCE	(84.7%)	750BCE	XIII
					690BCE	(8.9%)	660BCE	
					610BCE	(1.8%)	590BCE	

Table 75A Radiocarbon dating of Tell Abu al-Kharaz Phases IX–XIV

Lab. No.	Material	Area/ Locus	δ13C (‰)	14C BP	Calibrated 2σ			Phase
VERA-5073	twigs	7/365	-24.8±0.6	2565±40	810BCE	(51.4%)	730BCE	XIV
					700BCE	(14.6%)	660BCE	
					650BCE	(29.5%)	540BCE	
VERA-5073HS	twigs	7/365	-26.8±0.5	2595±40	840BCE	(76.3%)	740BCE	XIV
					690BCE	(8.5%)	660BCE	
					650BCE	(10.7%)	550BCE	
VERA-5074HS	twigs	7/384	-29.2±0.6	2555±40	810BCE	(44.2%)	720BCE	XIV
					700BCE	(51.2%)	540BCE	
VERA-5069	twigs	7/342	-26.0±0.5	2465±40	770BCE	(95.4%)	410BCE	XIV
VERA-5069HS	twigs	7/342	-25.1±0.6	2475±40	770BCE	(85.9%)	480BCE	XIV
					470BCE	(9.5%)	410BCE	
VERA-5070	twigs	7/353	-27.8±0.5	2450±35	760BCE	(23.8%)	680BCE	XIV
					670BCE	(71.6%)	400BCE	
VERA-5070HS	twigs	7/353	-27.9±0.6	2470±40	770BCE	(95.4%)	410BCE	XIV
VERA-5075HS	twigs	7/344	-27.9±0.6	2520±40	800BCE	(95.4%)	510BCE	XIV
VERA-5076HS	twigs	7/344	-26.6±0.6	2485±40	780BCE	(88.9%)	480BCE	XIV
					470BCE	(6.5%)	410BCE	
VERA-5279	twigs	7/476	-26.1±0.7	2505±25	780BCE	(95.4%)	530BCE	XIV
VERA-5279HS	twigs	7/476	-27.4±1.6	2550±25	800BCE	(55.3%)	740BCE	XIV
					690BCE	(18.1%)	660BCE	
					650BCE	(22.0%)	550BCE	
OxA-5088	twigs	7/42	-24.6	2495±45	796BCE	(0.96)	481BCE	XIV
					441BCE	(0.04)	413 BCE	
VERA-5269HS	charcoal	9/160	-27.1±2.0	3455±35	1890BCE	(95.4%)	1680BCE	Outlier
VERA-5276	olive pits	7/440	-26.3±1.3	>modern				Outlier

Table 75A continued Radiocarbon dating of Tell Abu al-Kharaz Phases IX–XIV

2. Reflections on the Radiocarbon Dates from Pella

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Material

Unpublished ceramic material from Pella and information about the local sequence of Iron Age occupation, i.e. Phases 1–8, where Phase 1 is transitional Late Bronze Age/early Iron Age and Phase 8 is Iron Age III/Persian, have – in connection with a cooperative research project – kindly been forwarded to the author by S. Bourke, the director of the excavations at Pella. As regards parallels to the Tell Abu al-Kharaz material from the ceramic corpus of Pella, which are supported by radiocarbon, only those from Phases 1–5 are here relevant for comparative studies (Table 75B).[90]

Nineteen radiocarbon dates from the Iron Age Phases 1–5 from Pella were obtained with the AMS (Accelerator Mass Spectrometry) technique at the VERA laboratory. Eighteen samples were seeds or olives, and one was charcoal. In five cases, only the humic acids could be dated (VERA-5297HS, VERA-5305HS, VERA-5307HS, VERA-5314HS and VERA-5317HS). In addition to the standard ABA dating of three samples their humic acid fractions were also dated for comparative studies (VERA-5304HS, VERA-5313HS and VERA-5311HS). The archaeological contexts from which the samples

[90] Twenty-four samples from Pella have been forwarded by the author to the VERA-laboratory, University of Vienna, where they were helpfully processed by E.M. Wild. Kind support has been received by M. Bietak (SCIEM 2000). Of these, five dates are from the second half of Late Bronze Age (Phases III–IV; not shown in table) and 19 dates from Iron Age I–IIA in Table 75B).

derived were conventionally dated prior to the radiocarbon dating, mainly according to the pottery sequences (see "Location" and "Phase" in Table 75B).

Results

The dates shown by VERA-5304/HS agree well with the conventional date for the transition Late Bronze Age/Iron Age in the (earlier part of the) 12th century although the spread is considerable. The dates given by VERA-5313/HS are far too low for this transitional period.

There are five datings from Iron Age I contexts: Two of them (VERA-5311/HS) are from a domestic context and in agreement with the expected date. The dates of two other samples (VERA-5299 and VERA-5300), which come from an Iron Age I pit (Pella Phases 2–3), seem to be too high according to the archaeological context and would better fit somewhere in the second half of the Late Bronze Age. The last sample (VERA-5312) is from an Iron Age I pit (Phases 2–3): its date is too low, relative to the expected date.

Two dates are from transitional Iron Age I/IIA. One sample (VERA-5309) is from a pit (Phases 3–4) and is dated as expected. The other one (VERA-5315) is from a domestic context: Its offered date is far too high compared with the anticipated one.

Eight dates are from Iron Age IIA and B contexts (Phases 4–5). The samples are from the "palace, the west palace and the temple" (VERA-5297HS, VERA-5302, VERA-5305HS, VERA-5306, VERA-5307HS, VERA-5310, VERA-5314HS and VERA-5317HS). The radiocarbon dates correspond well with the dates which are based on stratigraphy and the material evidence.

Comparison with the Tell Abu al-Kharaz dates and conclusions

There are no samples from Tell Abu al-Kharaz which are contemporaneous with those from Pella Phase 1, which then again show a considerable spread. The samples from Pella Phases 2–3 have counterparts in the sample material from Tell Abu al-Kharaz, at least as far as Phase 3 is concerned, which should correspond to Tell Abu al-Kharaz Phase IX. The Pella samples from "Iron Age I pit" (Phases 2–3) are either too high or too low, whereas the "Iron Age I domestic" sample fits sufficiently with the dating of Tell Abu al-Kharaz Phase IX: it seems that the organic material from the Pella pits contained both residual remains and intrusive matter.

The radiocarbon dates of the sample from "Iron Age I/IIA pit" from Phases 3–4 is in accordance with the suggested date of the archaeological context and comparable with those from Tell Abu al-Kharaz Phase X. However, the dates of the sample from the "Iron Age I/II domestic" context (again Phases 3–4) are higher than expected.

The Phase 4–5 samples from Pella, viz. "palace, west palace and temple", which are placed by the excavator in Iron Age IIA, are comparable with VERA-5081HS from Phase XI at Tell Abu al-Kharaz. The radiocarbon dates are in agreement with the expected dates.

It could be demonstrated that Pella also provided humic acid dates which are in close agreement with the respective dates of the ABA-treated samples (cf. WILD *et al*. 2013, and above concerning the dating of the HS-material from Tell Abu al-Kharaz).

Lab. No.	Material	Location	δ13C (‰)	14C BP	Calibrated 2σ			Pella Phases
VERA-5304	seeds	LB/IA fortress	-22.2 ± 0.7	3020 ± 35	1400BC	(95.4%)	1130BC	1
VERA-5304HS	seeds	LB/IA fortress	-22.9 ± 1.0	3025 ± 40	1410BC	(95.4%)	1130BC	1
VERA-5313	seeds	LB/IA fortress	-23.6 ± 1.9	2745 ± 40	1000BC	(95.4%)	810BC	1
VERA-5313HS	seeds	LB/IA fortress	-20.3 ± 0.7	2800 ± 35	1050BC	(95.4%)	840BC	1
VERA-5299	seeds	IA I pit	-18.2 ± 0.7	3040 ± 40	1420BC	(94.3%)	1190BC	2-3
					1150BC	(1.1%)	1130BC	
VERA-5300	olive	IA I pit	-20.7 ± 0.7	3070 ± 35	1430BC	(95.4%)	1250BC	2-3
VERA-5311	seeds	IA I domestic	-17.6 ± 0.8	2940 ± 35	1270BC	(95.4%)	1020BC	2-3
VERA-5311HS	seeds	IA I domestic	-21.6 ± 3.3	2925 ± 35	1260BC	(95.4%)	1010BC	2-3
VERA-5312	seeds	IA I pit	-27.1 ± 1.5	2735 ± 35	980BC	(3.4%)	950BC	2-3
					940BC	(92.0%)	800BC	
VERA-5309	olive	IA I/IIA pit	-22.7 ± 0.5	2810 ± 35	1060BC	(91.6%)	890BC	3-4
					880BC	(3.8%)	840BC	
VERA-5315	seeds	IA I/II domestic	-19.1 ± 1.1	3025 ± 35	1400BC	(91.8%)	1190BC	3-4
					1180BC	(1.7%)	1160BC	
					1150BC	(1.9%)	1130BC	
VERA-5297HS	seeds	IA II palace	-19.7 ± 0.7	2745 ± 35	980BC	(95.4%)	810BC	4-5
VERA-5302	seeds	IA II palace	-30.9 ± 1.3	2715 ± 35	930BC	(95.4%)	800BC	4-5
VERA-5305HS	seeds	IA II palace	-26.4 ± 1.8	2725 ±35	970BC	(1.2%)	960BC	4-5
					940BC	(94.2%)	800BC	
VERA-5306	seeds	IA II temple	-27.2 ± 0.8	2770 ± 35	1010BC	(95.4%)	830BC	4-5
VERA-5307HS	seeds	IA II west palace	-18.8 ± 0.7	2820 ± 40	1120BC	(93.7%)	890BC	4-5
					870BC	(1.7%)	850BC	
VERA-5310	seeds	IA II palace	-20.7 ± 0.8	2885 ± 35	1210BC	(92.7%)	970BC	4-5
					960BC	(2.7%)	930BC	
VERA-5314HS	seeds	IA II west palace	-23.3 ± 1.3	2670 ± 35	900BC	(95.4%)	790BC	4-5
VERA-5317HS	charcoal	IA IIA palace	-24.1 ± 0.7	2795 ± 35	1040BC	(95.4%)	840BC	4-5

Table 75B Radiocarbon dating of Pella Phases 1–5