

## ■ Accelerated Mass Spectrometry Radiocarbon Determination of Papyrus Samples

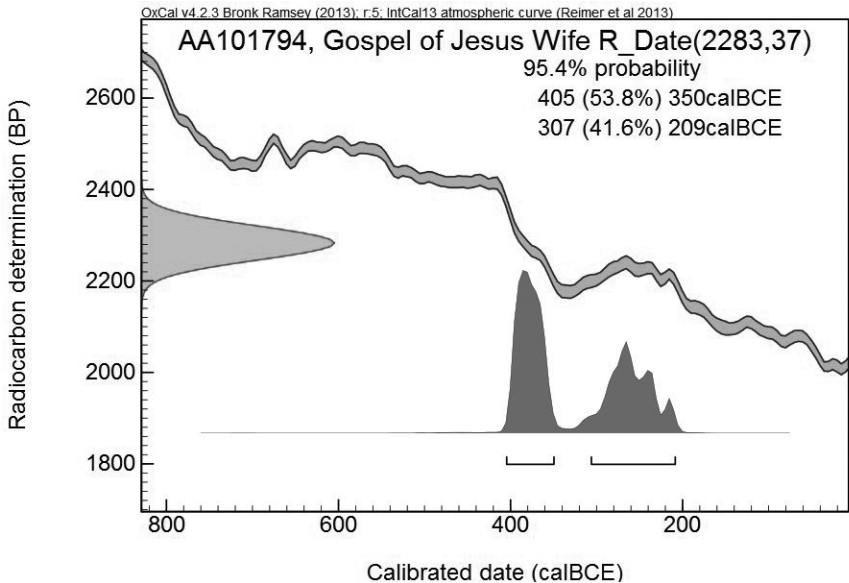
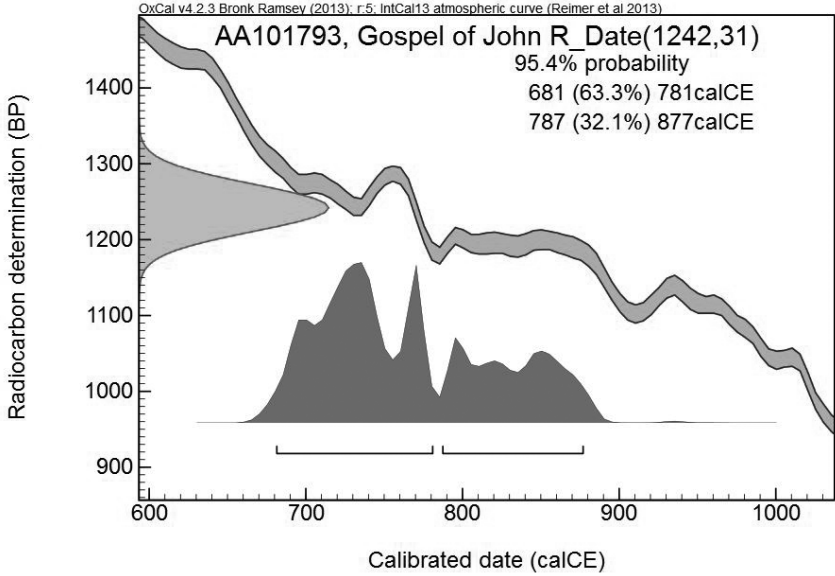
Gregory Hodgins

*NSF Arizona AMS Laboratory, University of Arizona*

Date no.	AA-101793	AA-101794
Sample	Gospel of John	<i>Gospel of Jesus's Wife</i>
$\delta^{13}\text{C}$	$-9.2\text{‰}$	$-14.3\text{‰}$
Fraction of modern carbon:	$0.8568 \pm 0.0033$	$0.7526 \pm 0.0035$
Uncalibrated Radiocarbon Age:	$1242 \pm 31$ $^{14}\text{C}$ yrs BP	$2283 \pm 37$ $^{14}\text{C}$ yrs BP
2 sigma,		
95.4% Calibrated age ranges:	681 cal C.E. to 877 cal C.E.	405 cal B.C.E. to 350 cal B.C.E. 307 cal B.C.E. to 209 cal B.C.E.

The values are quoted for an isotopic correction to  $-25\text{‰}$  for  $\delta^{13}\text{C}$ , which indicates the value of the stable-isotope ratio of  $^{13}\text{C}/^{12}\text{C}$  deviation from a known standard, in parts per mil (‰). The calibrated ages are based on cross-referencing the radiocarbon ages with known-age tree ring radiocarbon measurements, using the most recent calibration data set (INTCAL13). The calibration plots are shown on the next page.

The  $\delta^{13}\text{C}$  value of AA-101794 is lower than is typical for other radiocarbon-dated papyri and requires explanation. It might indicate the presence of a contaminant or have some other explanation. The presence of a contaminant with a different radiocarbon content than the papyrus would alter the bulk radiocarbon content. Consequently the low  $\delta^{13}\text{C}$  value sheds doubt upon the validity of the radiocarbon date. A discussion of the  $\delta^{13}\text{C}$  measurement is presented in a separate document.



Carbon stable isotope measurements on dated papyrus documents and botanical specimens.

Lab Reference	Origin	Dynastic Period or Name	Sample # or Name	Date	Error	$\delta^{13}\text{C}$
OxA-15313	Illahun	Senusret III	10009	3503	30	-9.4
VERA-3726	Illahun	Senusret III	10009	3543	29	-11.0
OxA-15315	Illahun	Senusret III	10041	3513	31	-8.9
VERA-3728	Illahun	Senusret III	10041	3565	29	-11.3
VERA-3735	Illahun	Amenemhet III	10044	3550	29	-10.8
OxA-15316	Illahun	Amenemhet III	10053	3542	30	-9.3
VERA-3729	Illahun	Amenemhet III	10053	3563	29	-10.8
VERA-3732	Illahun	Senusret III	10077	3563	29	-9.6
VERA-3733	Illahun	Amenemhet III	10091	3568	28	-7.8
OxA-15317	Illahun	Senusret III	10092	3532	31	-8.7
VERA-3730	Illahun	Senusret III	10092	3529	29	-10.2
OxA-15311	Illahun	Senusret III	10248	3532	31	-9.4
OxA-15310	Illahun	Amenemhet III	10018Bd	3560	33	-8.9
OxA-15314	Illahun	Amenemhet III	10038 b+c	3755	33	-10.1
VERA-3727	Illahun	Amenemhet III	10038 b+c	3522	29	-10.0
VERA-3734	Illahun	Amenemhet III	10038a	3512	29	-9.0
OxA-15309	Illahun	Amenemhet III	10081c	3626	33	-9.7
OxA-15318	Illahun	Senusret III	10345d	3518	31	-9.2
VERA-3731	Illahun	Senusret III	10345d	3513	29	-11.5
OxA-15312	Illahun	Amenemhet III	10419a	3485	31	-8.8
OxA-14993	Illahun	Senusret II	Fragment B2	3551	32	-9.4
OxA-14994	Illahun	Senusret II	Fragment B2	3483	32	-9.0
OxA-18052	Saqqara	Djoser	MMA 30948	2421	28	-8.1

OxA-20212	Abusir	Djedkare	BM10735/10	3911	31	-9.1
OxA-16838	Thebes	Amenemhat I or Senusret I	MMA 22.3.5239	3620	32	-9.8
VERA-4075	Thebes	Amenemhat I or Senusret I	MMA 22.3.5239	3679	29	-11
OxA-20189	Thebes	Ramesses IV	BM9999/97	2972	27	-9.1
OxA-20213	Thebes	Ramesses IX-XI	BM10326	2771	28	-10.8
OxA-20214	Thebes	Ramesses IX-XI	BM75018	2946	29	-9.2
LABEC/CIRCE	Alexandria?	Artemidorus Papyrus	Arte 1	1974	80	-11.5
LABEC/CIRCE	Alexandria?	Artemidorus Papyrus	Arte 2	1906	67	-11.5
LABEC/CIRCE	Alexandria?	Artemidorus Papyrus	Arte 3	1958	33	-11.5
OxA-16346	Nile River Bank	C. alopicuroides Rottb.	2a <sup>1</sup>	141	27	-9.0
OxA-16342	Alexandria	C. dives Del.	2.5a <sup>1</sup>	112	26	-8.3
OxA-16344	Alexandria	C. longus L.	27 <sup>1</sup>	126	27	-8.2
AA-62452	unknown	Codex Chaco	page 9	1739	48	-10.0
AA-62453	unknown	Codex Chaco	page 39	1726	47	-9.9
AA85363	Memphis	Early 18th Dyn., Book of the Dead	#371777E	3249	42	-9.3
AA99528	Medinet Madi	Manichaean Codex	cartonnage	1572	38	-10.0
AA101793	unknown	Gospel of John Coptic	fragment	1242	31	-9.2
AA101794	unknown	Gospel of Jesus Wife	fragment			-14.3

I. botanical specimen

OxA and VERA data graciously provided by Michael Dee, University of Oxford, and Ezra Marcus, University of Haifa, previously published in Christopher Bronk Ramsey et al., "Radiocarbon-Based Chronology for Dynastic Egypt," *Science* 328 (2010) 1554–57; and Michael Dee et al., "Investigating the Likelihood of a Reservoir Offset in the Radiocarbon Record for Ancient Egypt," *Journal of Archaeological Science* 37 (2010) 687–93.

LABEC/CIRCE data courtesy Marielena Fedi, dates previously published in Marielena Fedi et al., "The Artemidorus Papyrus: Solving an Ancient Puzzle with Radiocarbon and Ion Beam Analysis Measurements," *Radiocarbon* 52 (2010) 356–63.

AA85363 data courtesy Paul O'Rourke and Edward Bleiberg, Brooklyn Museum. AA99528 data courtesy Jason BeDuhn, Northern Arizona University. Other AA data courtesy Greg Hodgins and Tim Jull, University of Arizona.