

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -21.3 o/oo : lab. mult = 1)

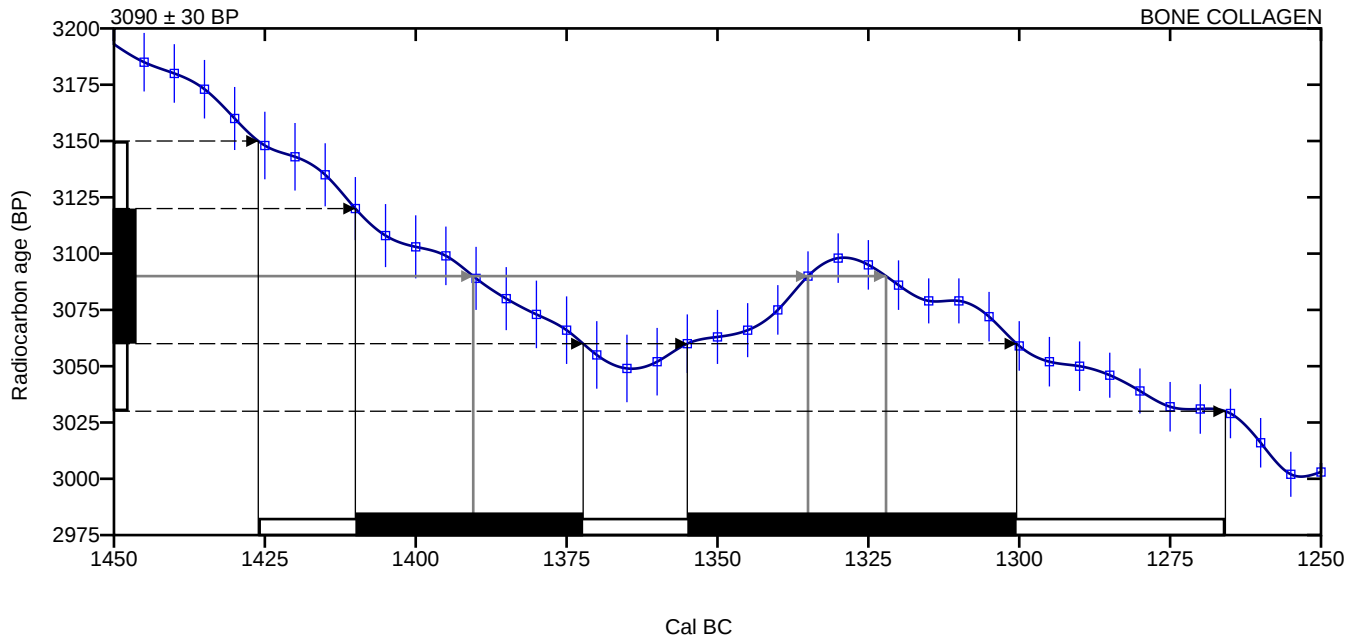
Laboratory number **Beta-412113**

Conventional radiocarbon age **3090 ± 30 BP**

Calibrated Result (95% Probability) **Cal BC 1425 to 1265 (Cal BP 3375 to 3215)**

Intercept of radiocarbon age with calibration
curve Cal BC 1390 (Cal BP 3340)
 Cal BC 1335 (Cal BP 3285)
 Cal BC 1320 (Cal BP 3270)

Calibrated Result (68% Probability) Cal BC 1410 to 1370 (Cal BP 3360 to 3320)
 Cal BC 1355 to 1300 (Cal BP 3305 to 3250)



Database used
INTCAL13

References

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

References to INTCAL13 database

Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP. Radiocarbon 55(4):1869–1887., 2013.

Beta Analytic Radiocarbon Dating Laboratory

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12 = -25.1 o/oo : lab. mult = 1)

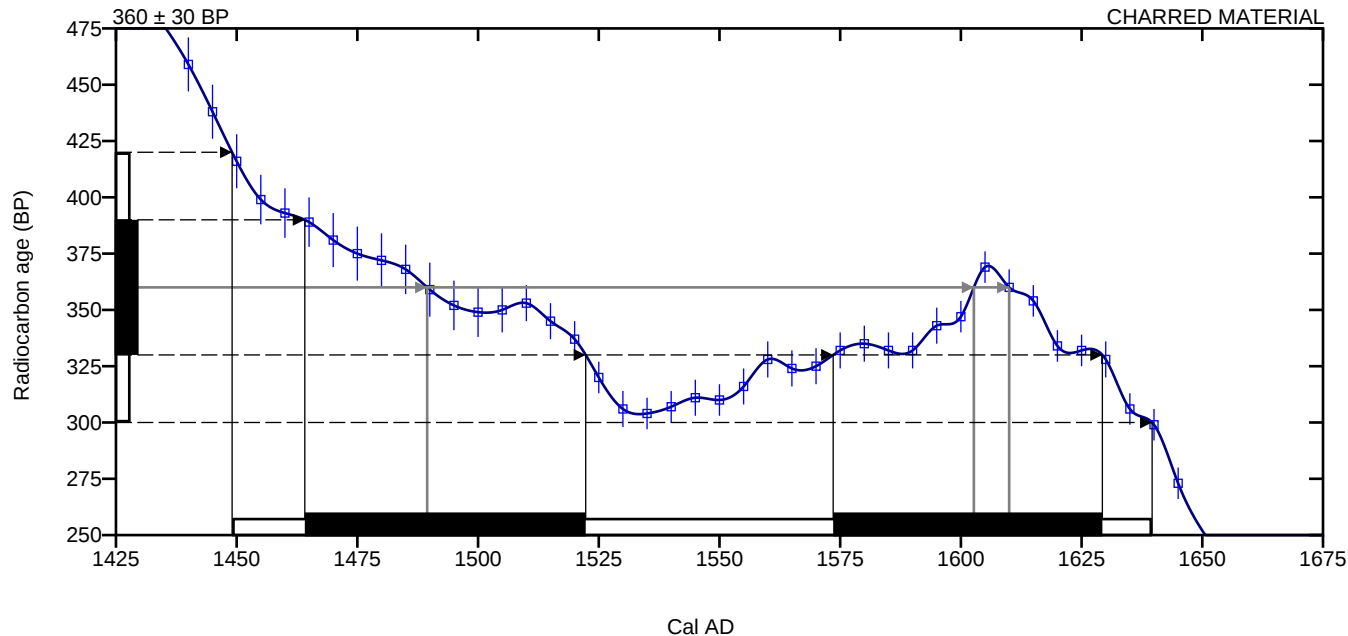
Laboratory number **Beta-412114**

Conventional radiocarbon age **360 ± 30 BP**

Calibrated Result (95% Probability) **Cal AD 1450 to 1640 (Cal BP 500 to 310)**

Intercept of radiocarbon age with calibration
curve Cal AD 1490 (Cal BP 460)
 Cal AD 1605 (Cal BP 345)
 Cal AD 1610 (Cal BP 340)

Calibrated Result (68% Probability) Cal AD 1465 to 1520 (Cal BP 485 to 430)
 Cal AD 1575 to 1630 (Cal BP 375 to 320)



Database used
INTCAL13

References

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates, Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

References to INTCAL13 database

Reimer PJ et al. IntCal13 and Marine13 radiocarbon age calibration curves 0–50,000 years cal BP. Radiocarbon 55(4):1869–1887., 2013.

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REPORT OF RADIOCARBON DATING ANALYSES

Susan E. Allen

Report Date: October 26, 2018

University of Cincinnati

Material Received: October 19, 2018

Laboratory Number

Sample Code Number

Conventional Radiocarbon Age (BP) or
Percent Modern Carbon (pMC) & Stable Isotopes

Calendar Calibrated Results: 95.4 % Probability
High Probability Density Range Method (HPD)

Beta - 507371

015-001-004 F1

2170 +/- 30 BP

IRMS $\delta^{13}C$: -25.1 o/oo

(92.9%)
(2.5%)

360 - 156 cal BC
134 - 116 cal BC

(2309 - 2105 cal BP)
(2083 - 2065 cal BP)

Submitter Material: Seeds

Pretreatment: (charred material) acid/alkali/acid

Analyzed Material: Charred material

Analysis Service: AMS-Standard delivery

Percent Modern Carbon: 76.33 +/- 0.29 pMC

Fraction Modern Carbon: 0.7633 +/- 0.0029

D14C: -236.73 +/- 2.85 o/oo

$\Delta^{14}C$: -242.98 +/- 2.85 o/oo(1950:2,018.00)

Measured Radiocarbon Age: (without d13C correction): 2170 +/- 30 BP

Calibration: BetaCal3.21: HPD method: INTCAL13

Results are ISO/IEC-17025:2005 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the ^{14}C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. $\delta^{13}C$ values are on the material itself (not the AMS $\delta^{13}C$). $\delta^{13}C$ and $\delta^{15}N$ values are relative to VPDB-1. References for calendar calibrations are cited at the bottom of calibration graph pages.

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL13)

(Variables: $\delta^{13}\text{C} = -25.1$ o/oo)

Laboratory number **Beta-507371**

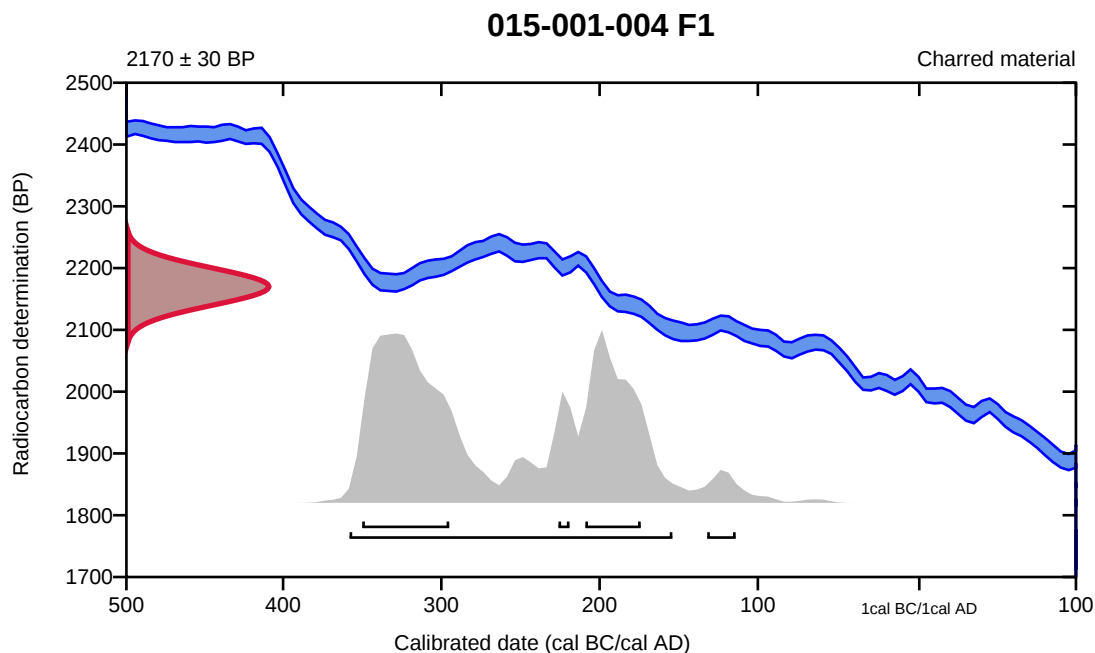
Conventional radiocarbon age **2170 $\pm$ 30 BP**

95.4% probability

(92.9%)	360 - 156 cal BC	(2309 - 2105 cal BP)
(2.5%)	134 - 116 cal BC	(2083 - 2065 cal BP)

68.2% probability

(40.2%)	352 - 297 cal BC	(2301 - 2246 cal BP)
(24.3%)	211 - 176 cal BC	(2160 - 2125 cal BP)
(3.7%)	228 - 221 cal BC	(2177 - 2170 cal BP)



Database used
INTCAL13

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

References to Database INTCAL13

Reimer, et.al., 2013, Radiocarbon55(4).