STABLE ISOTOPE TREE-RING DATES: LIST 4

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INTRODUCTION

The objective cross-dating of annually resolved tree-ring stable isotope sequences from oak latewood cellulose has been shown to provide an extremely effective precision dating method for oak and non-oak timbers. The method is detailed in Loader et al. (2019). We report here the fourth date list for stable isotope dated samples. This list includes dates for timbers from several structures where ring-width dating was previously unsuccessful. These buildings and samples have now been successfully dated using isotopic methods. In some cases this has allowed floating site sequences to be dated. The samples analysed comprise both oak and elm, and include samples that exhibit disturbance in their ring series. For some buildings where isotope dendrochronology has established or confirmed the dating of more extensive ring-width assemblages, details are given in the main tree-ring date lists, with only the isotope dating presented here. When the date is only included in this list, information on the measured isotope series precedes that for the ring-width samples.

INFORMATION REPORTED

Each entry includes: the type of sample; the sample code; the final measured ring date and sapwood complement; the Student's t-value; the total number of rings (N) and the number of rings measured isotopically (Ni) (N/Ni) and the probability (1/p) of the match (corrected for filtering, autocorrelation and resampling). All the timbers have been dated against the Central England Master chronology developed by Loader et al. (2019), or against site masters themselves dated from this. Details are given for samples taken for ring-width dating from the building, unless the site is included in the tree-ring date lists; for these samples, the code 'i' indicates an isotope date, 'di' a ring-width date supported by or determined from an isotope date and 'ir' indicating where an isotope date has received additional support from wiggle-match radio-carbon dating. Where a date is assigned, the felling date or range is determined taking into account any rings not meas-ured isotopically and the presence and completeness of the sapwood, following criteria identical to ring-width dendrochronology (English Heritage 1998; Miles 1997 and 2006; Loader et al. 2019); the 95% confidence limits for the number of sapwood rings are 9–41, 11–41 and 12–45, depending on the region. Complete statistical reports are available from the first author upon request, citing the laboratory code e.g. [SWAN007].

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ABBREVIATIONS

ODL	Oxford Dendrochronology Laboratory
UWTSDDL	University of Wales, Trinity Saint David, Lampeter, Dendrochronology Laboratory
UCL	Institute of Archaeology, University College London

Environments of Change Project. https://www.medieval-environment.com/

ENGLAND

CAMBRIDGESHIRE

1. BOURN, Bourn mill, Caxton End (TL 3118 5800)

a. Crown tree (elm) — Felling date winter: 1729/30
b. Wall post (elm) — Felling date winter: 1739/40
c. Wall post (elm) — Felling date range: 1729–32

Isotope dating: (a) Crown tree (Bourn11b) 1729(C)i: t = 5.78, N/Ni 95/78, 1/p = 11926; (b) Wall post (Bourn 12b) 1739(C)i: t = 5.33, N/Ni 51/42, 1/p = 410; Mean of (a) and (b) t = 7.03, N/Ni 105/88, 1/p > 1Million; (c) Wall post (Bourn13b)(50 þ 8–11NMC) dated against mean of (a) and (b) 1722–32ir: t = 5.78, N/Ni 50/41, 1/p > 1Million [SWAN070].

Ring-width samples: see Bridge et al. (this volume).

The mill contains oak and elm timbers and three samples of elm were made available for isotope dendrochronology (UCL). Samples (a) and (b) from the crown tree and one wall post-dated securely, passing the dating thresholds of Loader et al. (2019). Sample (c) does not date independently, but it matches securely against the mean series of (a) and (b). This relative match was supported by wiggle-match radiocarbon dating. For details of the building, see Tree-Ring Date List 335, p. xxx, this volume. For further details on the ring-width dendrochronology and radiocarbon dating, see RRS 12/2022. The waney edge was preserved on samples (a) and (b), meaning that it was possible to assign a felling date. It is not possible to conclusively assign a precise number of sapwood rings owing to similarities between the heartwood and sapwood of elm.

2. GREAT GRANSDEN, Great Gransden Windmill (TL 2772 5552)

a. Crown tree — Felling date winter: 1644/5
b. Brake handle (ex-situ) — Felling date range: 1757–90

Isotope dating: (a) Crown tree (ggm04c) 1644(29C)i: t = 8.79, N/Ni 90/76, 1/p >1Million; (b) Brake handle (ggm17a) 1745(h/s þ 11NM)i: t = 7.86, N/Ni 52/46, 1/p > 1Million; [SWAN072]

This post and open-trestle windmill located east of Great Gransden is a Scheduled Ancient Monument (LEN 1006820) and Grade II Listed Building (LEN 12211279). The structure was first sampled for dendrochronological dating by M. Bridge (UCL) in 2015–16. Two samples were dated isotopically to provide additional dating evidence and to support interpretation of the construction and maintenance history of the mill. For a description of the associated ring-width dendrochronology, see Tree-Ring Date List 250 (VA 44 (2015), 82 and RRS 23/2015 and 49/2022).

EAST SUSSEX

3. ROBERTSBRIDGE, 12 & 14 High Street, Rosebank (TQ 7382 2372), Hall — Felling date range: 1403–35

Isotope dating: (a) North end tiebeam (rbr03) 1394(h/s)i: t = 6.31, N/Ni 41/41, 1/p = 7676 [SWAN074].

Rosebank, Robertsbridge is a Grade I listed building of Wealden form. Originally sampled by M. Bridge for ring-width dendrochronology in 2014, an initial survey of five samples failed to yield sufficient rings for dating. A single timber from a core taken in 2021 has now been dated as part of the Environments of Change Project. The dating is consistent with felling dates since obtained on different timbers by Andy Moir (Tree-Ring Services Report: TNBR/41/14). See Tree-Ring Date List 330, p. xxx, this volume.

4. PATCHAM (now Brighton and Hove), All Saints Church (TQ 3023 0909) — Felling date range: 1520–52

Isotope dating: Wallplate (PATCH2) 1505(h/s)i: t = 6.18, N/Ni 58/43, 1/p = 5223; Tiebeam (PATCH1) 1517(h/s)i: t = 8.56, N/Ni 56/57, 1/p > 1Million; Mean of PATCH1 and PATCH 2 1517: t = 8.98, N/Ni 57/57, 1/p > 1Million [SWAN075].

A wall plate and adjacent tiebeam preserved in the wall of All Saints Church were sampled for isotope dendrochronology by M. Bridge as part of the Environments of Change Project. It was thought the wall plate could be eleventh century, though the tiebeam was known to be later. Two isotope series were obtained of 58 and 56 rings. The isotope dendrochronology reveals that these two timbers are contemporaneous; they may represent late mediaeval levelling-up of the masonry to support the ‘new’ late mediaeval roof.

GLOUCESTERSHIRE

5. GLOUCESTER, Westgate Street, Church of St Nicholas (SO 8290 1877), nave Felling date range: 1345–72

Isotope dating: (a) Common rafter (north side) (SN06) 1335(h/s)i: t = 6.15, N/Ni 76/64, 1/p = 27848; (b) Common rafter (south side) (SN07) 1345(8)i: t = 6.51, N/Ni 84/73, 1/p > 181k; Mean (a) and (b) 1347i: t = 6.83, N/Ni 82/78, 1/p > 920k; [SWAN073]. Ring-width samples: see p. xxx, this volume.

Two samples from the nave were provided for stable isotope dendrochronology with the aim of assigning chronology to a 'floating' assemblage of six timbers collected from the nave (UWTSDDL). The dendrochronological dating of St Nicholas Church is described in Tree-Ring Date List 332, p. xxx, this volume.

WARWICKSHIRE

6. STRATFORD-ON-AVON, Dower House (SP 2005 5447), Range A Felling date: Winter 1589/90

Isotope dating: (a) corner post (stdh04) 1589(20C)i: t = 8.07, N/Ni 87/64, 1/p > 1Million; [SWAN076]. Ring-width samples: see Tree-Ring Date List 335, p. xxx, this volume.

A single timber from Range A was submitted for stable isotope dating (ODL). The timber exhibited several groups of narrow rings which may represent periods of forest management and may have contributed to the timber not dating by ring-width dendrochronology. For a description of the building, see Tree-Ring Date List 335, p. xxx, this volume.