***Caveat emptor*! - Wiggle-matching European Wood Samples (AD 46–AD 286)**

Alex Bayliss1, David Brown2, Michael Dee3, Peter Marshall1, and Lukas Wacker4

1 Historic England, Cannon Bridge House, 25 Dowgate Hill, London, EC4R 2YA, UK. alex.bayliss@historicengland.org.uk

2 School of Natural and Built Environment, The Queen’s University, Belfast, BT7 1NN, UK

3 Centre for Isotope Research, University of Groningen, Nijenborgh 6, 9747 AG Groningen, Netherlands

4 Laboratory of Ion Beam Physics, ETH Zürich, Otto-Stern-Weg 5, 8093 Zürich, Switzerland

**Supplementary Material**

#### **Dendrochronological dating of the bog oak samples from Balloo Cottage, Co. Down, Northern Ireland (Q812–3, Q815, Q837, Q1081, and Q-1098)**

In the early 1970s, slices were collected from 54 (*Quercus* sp.) bog oak timbers from a cottage when it was demolished, in Balloo townland, Co. Down, Northern Ireland (54.47°N, 5.71°W).

As the samples were dry coming from the building, polishing of the cut samples was undertaken using a sander and fine sandpaper to produce a good polished surface. The dust retained in the spring pores on the timbers was removed using a rubber and then finely ground chalk was rubbed onto the prepared surface to define the annual tree-ring boundaries more clearly for measurement. The ring-widths were measured to a precision of 1/20mm using a travelling stage in the early 1970s.

The ring-width series of seven of these samples were included in the chronology (Table S1). The construction of the chronology followed the procedures described by Baillie (1982). Samples with the best correlation values were combined to form sub-site masters. These were then used to date other samples. The other dated samples were incorporated into a new sub-site master until a coherent master chronology was formed. The individual samples were then compared with each other giving the correlation values presented in the *t*-value matrix (Table S2). The correlation *t-*values are based on CROS84 (Munro 1984).

**Table S1:** Details of the cross-matched samples from the Balloo Cottage one master chronology.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **Rings** | **Sapwood Rings** | **Absolute Dating (AD)** |
| Q812 | 217 | No sapwood | AD 86–302 |
| Q813 | 153 | No sapwood | AD 52–204 |
| Q815 | 259 | No sapwood | AD 54–312 |
| Q821 | 174 | No sapwood | AD 113–286 |
| Q837 | 112 | No sapwood | AD 23–134 |
| Q1081 | 220 | No sapwood | AD 56–275 |
| Q1098 | 120 | No sapwood | AD 17–136 |

**Table S2:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **QUB ID** | **Q812** | **Q813** | **Q815** | **Q821** | **Q837** | **Q1081** | **Q1098** |
| **Q812** | - | 8.82\*\*\* | 9.95\*\*\* | 7.28\*\*\* | -- | 9.90\*\*\* | -- |
| **Q813** | - | - | 8.01\*\*\* | 4.20\* | 8.40\*\*\* | 9.31\*\*\* | -- |
| **Q815** | - | - | - | 9.31\*\*\* | 5.00\*\*\* | 11.89\*\*\* | 4.31\* |
| **Q821** | - | - | - | - | -- | 6.35\*\*\* | 5.62\*\*\* |
| **Q837** | - | - | - | - | - | 7.48\*\*\* | 5.70\*\*\* |
| **Q1081** | - | - | - | - | - | - | 5.54\*\* |
| **Q1098** | - | - | - | - | - | - | - |

The Balloo Cottage master chronology consists of seven samples. It is 296 years in length and dates from AD 17 to AD 312. Table S3 gives the correlation values of this master chronology with other site chronologies from Ireland. Only correlation values over *t* = 4 are included in the table. The correlation *t-*values are again based on CROS84 (Munro 1984).

**Table S3:** Correlation values for the 296-year Balloo Cottage 1 master chronology with other site and regional chronologies (\*\*\* = extremely significant match; \*\* = very significant match and \* = significant match)

|  |  |  |
| --- | --- | --- |
| Site chronology | Start and end date of chronology | Correlation value with Balloo Cottage 1 |
| Tully Lough, Co. Monaghan | AD 122 to AD 271 | *t* = 6.71\*\*\* |
| Mill Lough, Co. Fermanagh | 13 BC to AD 551 | *t* = 5.67\*\*\* |
| Lisbarnet Cottage, Co. Down | 50 BC to AD 172 | *t* = 5.46\*\*\* |
| Ballinderry, Co. Antrim | 339 BC to AD 706 | *t* = 4.94\* |
| Teeshan, Co. Antrim | AD 84 to AD 579 | *t* = 4.87\* |
| Allistragh, Co. Armagh | AD 39 to AD 337 | *t* = 4.81\* |

**Figure S1:** Bar diagram showing the relative positions of the dated samples in the Balloo Cottage 1 master chronology.



Timbers from Balloo Cottage were dry when sampled and the remainder of the samples are stored in the Dendrochronology Laboratory, School of Natural and Built Environment, Queen’s University, Belfast. Ring-width data for all the measured samples from Balloo can be found at <http://www.chrono.qub.ac.uk/bennett/dendro_data/dendro.html>.

Four samples from the Balloo Cottage site chronology, Q815, Q821, Q837, and Q1081, have been used to supply single-year samples for radiocarbon calibration. For the selected period, the trees with the widest annual growth rings were chosen, so that extracting the individual annual growth rings is as easy as possible. The samples to be used were cleaned with a razor blade and the annual growth rings marked. The annual growth rings were split from the bulk sample using a scalpel bade and the early wood growth was removed using a scalpel. This processing means that the wood samples provided only have the latewood part of the annual growth ring.

Sample Q837 was used to supply samples from AD 43 to AD 52; Q815 was used to supply samples from AD 53 to AD 102 (the sample for AD 53 came from an unmeasured ring at the start of the sequence); Q1081 was used to supply samples from AD 103 to AD 113 and from sample from AD 196 to AD 212, while sample Q821 supplied samples from AD 114 to AD 193. The ring-width data for the sampled timbers are provided in Table S4.

Further samples have been obtained subsequently from other radii of samples Q815 and Q821. The ring-widths of these radii were measured in 2023 to a precision of 1/100mm using a using a micro-computer based travelling stage. The new radius of Q815 spans rings 28–207 of the original radius (AD 81–180) and cross-matches it at a *t*-value of 7.33 \*\*\*. The new radius of Q821 spans rings 2–258 of the original radius (AD 114–257) and cross-matches it at a *t*-value of 5.04 \*\*\*. Again, the correlation *t*-values are based on CROS84 (Munro 1984). The ring-width data for these additional radii are provided in Table S5.

**Table S4:**  Ring-width data for the timbers from Balloo, Co. Down, which provided single-ring samples for radiocarbon calibration (Heidelberg format)

BALLOO, CO. DOWN

Q837

112

 5 11 6 9 15 14 3 11 6 3

 8 9 20 10 11 13 17 13 14 21

 24 31 16 25 20 16 16 19 23 35

 39 39 33 26 34 14 32 18 11 18

 15 18 25 25 23 16 15 12 4 6

 6 10 14 14 10 19 16 24 20 16

 16 12 12 9 20 9 6 9 9 7

 16 10 16 13 25 12 20 20 30 25

 8 6 10 10 18 12 22 25 26 41

 18 23 14 19 25 31 20 23 13 21

 13 13 19 13 18 15 22 19 30 37

 33 36

Comment - MGLB 1970s measurement in 1/20mm

Start Date: AD 23

End date: AD 134

BALLOO, CO. DOWN

Q815

259

 34 26 26 20 17 16 16 14 20 18

 20 22 18 14 13 16 23 11 13 28

 32 23 28 16 28 23 27 21 23 23

 14 16 17 30 25 19 22 17 13 15

 17 21 24 26 11 14 14 16 12 9

 7 12 8 10 12 10 11 10 10 8

 11 12 18 21 24 24 24 20 27 29

 14 18 27 24 17 20 18 21 19 14

 17 12 14 19 22 29 27 18 18 11

 13 10 10 12 17 20 12 20 27 20

 24 21 25 21 24 17 17 17 18 20

 18 19 15 17 17 15 13 13 9 11

 14 11 9 7 8 9 10 9 9 10

 10 12 13 12 10 13 10 11 7 10

 11 11 12 17 10 10 10 11 9 11

 9 9 11 12 14 12 13 9 10 8

 7 8 9 6 6 7 6 6 6 5

 6 6 6 6 6 7 8 8 7 8

 8 8 8 9 14 9 7 9 9 9

 8 9 10 10 10 10 9 9 7 10

 12 9 8 8 8 9 9 7 8 10

 8 7 6 5 5 6 5 7 9 7

 7 5 7 7 7 7 9 12 8 8

 7 6 10 4 7 5 6 5 5 5

 5 5 5 6 4 5 5 9 5 5

 5 4 5 4 6 8 7 6 4

Comment - MGLB 1970s measurement in 1/20mm

Start Date: AD 54

End Date: AD 312

BALLOO, CO. DOWN

Q821

174

 8 13 14 19 23 22 24 19 16 23

 30 12 14 17 20 16 18 26 23 19

 15 13 10 12 16 20 24 18 13 15

 12 12 13 11 11 15 17 11 16 18

 13 14 16 23 24 26 17 22 19 17

 16 12 15 14 14 14 13 8 11 8

 8 10 10 10 6 7 7 8 8 11

 11 7 13 18 15 16 16 15 14 12

 9 15 15 15 17 13 14 15 13 12

 14 14 18 16 14 15 15 16 17 14

 14 11 10 11 11 9 9 9 10 9

 9 9 10 10 10 9 11 11 14 11

 14 12 13 13 15 18 12 9 10 13

 13 10 15 12 10 12 12 9 11 8

 11 10 7 8 8 10 9 10 9 9

 13 12 9 9 11 7 7 7 10 12

 10 10 8 7 8 7 7 9 11 8

 8 8 6 7

Comment - MGLB 1970s measurement in 1/20mm

Start Date: AD 113

End Date: AD 286

BALLOO, CO. DOWN

Q1081

220

 17 32 24 27 23 15 21 18 24 26

 18 17 10 18 21 9 11 26 29 32

 36 28 37 35 44 38 36 42 35 23

 27 34 25 18 23 23 20 38 29 40

 26 32 12 19 19 26 24 9 7 14

 8 11 10 14 15 11 20 11 18 15

 23 21 28 28 20 17 28 19 13 16

 30 24 17 19 14 20 29 20 32 16

 19 23 25 34 41 30 39 26 24 20

 16 27 37 37 24 34 51 21 22 24

 28 20 31 16 19 28 33 33 25 38

 26 27 22 18 14 20 8 11 13 11

 10 10 11 12 12 10 12 9 7 13

 23 14 15 17 12 12 7 7 9 11

 15 28 22 18 15 22 15 19 16 15

 21 18 21 17 19 12 10 10 8 8

 10 6 7 8 8 6 8 6 7 7

 10 6 7 10 11 19 12 16 28 19

 13 13 25 12 14 27 17 17 13 24

 24 17 19 17 12 14 11 19 18 15

 8 9 14 10 10 10 9 15 12 10

 8 7 4 14 12 12 14 16 12 11

Comment - MGLB 1970s measurement in 1/20mm

Start Date: AD 56

End Date: AD 275

**Table S5:**  Ring-width data for additional radii measured from samples Q815 and Q821 from Balloo, Co. Down (Heidelberg format)

BALLOO, CO. DOWN

Q815DMB23

100

 104 99 131 96 95 89 161 88 93 94

 67 63 74 70 96 119 118 61 54 63

 84 53 31 32 42 49 38 43 44 55

 50 49 47 64 61 116 118 117 122 113

 112 153 150 80 105 104 132 98 113 125

 136 124 99 122 85 94 102 98 131 117

 88 70 73 68 65 64 65 72 119 84

 89 116 77 100 86 109 114 158 100 89

 118 74 82 87 96 91 60 61 73 81

 98 73 59 51 35 35 35 32 29 42

Comment - DMB 13-10-23 measurement in 1/100mm

Start Date: 81AD

End Date: 180AD

BALLOO, CO. DOWN

Q821DMB23

144

 66 56 97 100 95 93 95 84 126 126

 73 78 79 82 73 95 78 94 84 51

 80 51 55 72 98 109 97 88 89 58

 64 44 46 76 95 98 88 120 99 115

 109 126 105 120 122 85 86 94 117 124

 104 116 82 106 106 95 78 63 54 48

 45 51 34 31 32 44 34 44 52 40

 32 50 67 69 61 75 70 75 52 53

 45 70 68 79 79 83 74 73 80 73

 64 84 73 80 73 56 80 51 70 35

 64 52 37 28 36 44 41 42 41 39

 34 31 34 33 35 39 40 47 43 53

 48 60 42 43 68 63 50 51 54 65

 37 48 47 54 65 57 59 50 39 48

 47 47 35 56

Comment - DMB 13-10-23 measurement in 1/100mm

Start Date: 114AD

End Date: 257AD

#### **Dendrochronological dating of the bog oak samples from Ballinderry, Co. Antrim, Northern Ireland (Q9881, Q9885, Q9886 and Q9888)**

Thirty-six oak wood samples were collected from stumps and trunks from lakeside oaks in Ballinderry townland, Co. Antrim, Northern Ireland (54.55°N, 6.28°W).

The samples were taken from ditches and field drainage by the local farmer and left in stacks across a number of fields. All the cut samples were damp. The damp samples were prepared using a scalpel blade to remove the rough wood from the surface of the sample and to expose the tree-ring pattern. If the wood sample was soft or the ring pattern needed to be clarified, a razor blade was used. Finely ground chalk was then rubbed onto the prepared surface to define the annual tree-ring boundaries more clearly for measurement. The ring-widths were measured to a precision of 1/50mm using a travelling stage. This was completed between July and October 1999. Sometimes more than one radius was measured for an individual sample and so some ring series are a mean of two or more measurement series on the same sample.

The ring-width series of twenty of these samples were included in the chronology (Table S6). The construction of the chronology followed the procedures described by Baillie (1982). Samples with the best correlation values were combined to form sub-site masters. These were then used to date other samples. The other dated samples were incorporated into a new sub-site master until a coherent master chronology was formed. The individual samples were then compared with each other giving the correlation values presented in the *t*-value matrix (Table S7). The correlation *t-*values are based on CROS84 (Munro 1984).

**Table S6:** Details of the cross-matched samples from the Ballinderry (14) master chronology.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sample** | **Rings** | **Sapwood Rings** | **Absolute Dating (CE)** |
| Q9847 | 289 | No sapwood | AD 176–464 |
| Q9851 | 238 | 18 not complete | AD 339−576 |
| Q9852M | 403 | No sapwood | AD 216−618 |
| Q9853 | 127 | No sapwood | AD 157−283 |
| Q9856 | 122 | No sapwood | AD 163−284 |
| Q9880 | 162 | No sapwood | AD 305−466 |
| Q9881 | 227 | No sapwood | AD 110−336 |
| Q9883 | 328 | No sapwood | AD 25−352 |
| Q9885 | 206 | No sapwood | AD 175−380 |
| Q9886 | 212 | No sapwood | AD 114−325 |
| Q9887 | 274 | No sapwood | AD 133−406 |
| Q9888 | 258 | No sapwood | AD 107−364 |
| Q9889 | 149 | No sapwood | AD 157−305 |
| Q9892 | 200 | No sapwood | AD 235−434 |

**Table S7**: *t*-value matrix for ring-width series in the Ballinderry master chronology (-- = no correlation value; nsm = non-significant match; nh = not highest match; \* = significant match; \*\* = very significant match; \*\*\* = extremely significant match)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Q9851 | Q9880 | Q9847A | Q9892 | Q9887 | Q9885 | Q9888 | Q9883 | Q9881 | Q9886 | Q9889 | Q9856 | Q9853 |
| Q9852M | 8.97 \*\*\* | 8.43 \*\*\* | 6.52 \*\*\* | 5.72 \*\*\* | 6.52\*\*\* | 5.85 \*\*\* | 5.31 \*\*\* | 4.22 \* | 4.15 nsm | 2.10 nh | 2.32 nh | ̶ | 2.56 nh |
| Q9851 | ̶ | 7.08 \*\*\* | 3.34 nh | 3.17 nh | 3.37 nh | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ |
| Q9880 | ̶ | ̶ | 4.07 \* | 5.11 \*\*\* | 5.42 \*\*\* | 5.18 \*\*\* | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ |
| Q9847A | ̶ | ̶ | ̶ | 5.64 \*\*\* | 7.76 \*\*\* | 5.84 \*\*\* | 7.65 \*\*\* | 5.31 \*\* | 7.77 \*\*\* | 3.03 nh | 4.70 \*\* | 2.91 nh | 3.44 nsm |
| Q9892 | ̶ | ̶ | ̶ | ̶ | 7.06 \*\*\* | 9.31 \*\*\* | 4.22 nsm | 3.55 nh | 4.47 \*\* | 6.73 \*\*\* | 4.35 \* | ̶ | ̶ |
| Q9887 | ̶ | ̶ | ̶ | ̶ | ̶ | 9.95 \*\*\* | 5.41 \*\*\* | 3.87 nsm | 9.08 \*\*\* | 6.57 \*\*\* | 5.73 \*\*\* | 4.09 \* | 5.36 \*\* |
| Q9885 | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | 5.03 \*\* | 4.05 nh | 7.34 \*\*\* | 6.24 \*\*\* | 4.06 nsm | ̶ | 4.59 \* |
| Q9888 | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | 7.91 \*\*\* | 10.36 \*\*\* | 5.09 \*\*\* | 4.71 \* | ̶ | 3.12 nh |
| Q9883 | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | 4.93 \*\*\*  | 3.79 nsm | 4.57 \* | 4.46 \* | 3.11 vwm |
| Q9881 | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | 7.38 \*\*\* | 5.04 \*\*\* | 4.32 \* | 4.47 \* |
| Q9886 | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | 5.70 \*\*\* | 4.26 \* | 5.47 \*\* |
| Q9889 | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | 3.87 \* | 3.86 \* |
| Q9856 | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | ̶ | 3.64 nsm |

The Ballinderry (14), Co Antrim master chronology consists of 14 samples (Fig S2). It is 594 years in length and dates from AD 25 to AD 618. Table S8 gives the correlation values of this master chronology with other site chronologies from Ireland. The correlation *t-*values are based on CROS84 (Munro 1984).

**Table S8:** Correlation values for the 594-year Ballinderry (14) master chronology with other site and regional chronologies (\*\*\* = extremely significant match; \*\* = very significant match and \* = significant match)

|  |  |  |
| --- | --- | --- |
| **Site chronology** | **Start and end date of chronology** | **Correlation value with Ballinderry (14)** |
| Deer Park, Co. Antrim | AD 311 to AD 644 | *t* = 9.48\*\*\* |
| Toome, Londonderry | AD 140 to AD 649 | *t* = 7.93\*\*\* |
| Teeshan, Co. Antrim | AD 84 to AD 579 | *t* = 5.99\*\*\* |
| Corlea 5, Co. Longford | AD 286 to AD 555 | *t* = 6.42\*\*\* |
| Oxford Island, Co. Armagh | AD 265 to AD 492 | *t =* 6.22\*\*\* |

**Figure S2:** Bar diagram showing the relative positions of the dated samples from Ballinderry, Co. Antrim



Timbers from Ballinderry, Co. Antrim have been dried and the remainder of the samples are stored in the Dendrochronology Laboratory, School of Natural and Built Environment, Queen’s University, Belfast. Ring-width data for all the measured samples from Balloo can be found at <http://www.chrono.qub.ac.uk/bennett/dendro_data/dendro.html>.

Four samples from the Ballinderry site chronology, Q9881, Q9885, Q9886 and Q9888 have been used to supply single-year samples for radiocarbon calibration. For the selected period, the trees with the widest annual growth rings were chosen, so that extracting the individual annual growth rings is as easy as possible. The samples to be used were cleaned with a razor blade and the annual growth rings marked. The annual growth rings were split from the bulk sample using a scalpel bade and the early wood growth was removed using a scalpel. This processing means that the wood samples provided only have the latewood part of the annual growth ring.

Sample Q9881 was used to supply samples from AD 282 to AD 288; Q9885 was used to supply samples from AD 226 to AD 260; Q9886 was used to supply samples from AD 261 to AD 281 and for AD 289; while sample Q9888 supplied samples from AD 211 to AD 213. The ring-width data for the sampled timbers is provided in Table S9.

**Table S9:** Ring-width data for the timbers from Ballinderry, Co. Antrim, which provided single-ring samples for radiocarbon calibration (Heidelberg format)

BALLINDERRY, CO. ANTRIM

Q9881

227

 38 66 93 33 37 33 16 57 52 29

 49 37 38 41 57 46 60 30 18 29

 28 26 35 41 48 43 49 56 35 57

 65 32 58 15 12 13 18 39 29 20

 22 66 65 44 39 37 37 29 28 26

 18 18 34 40 72 39 38 61 62 50

 77 64 38 64 75 43 53 46 40 43

 68 106 153 103 135 89 76 91 61 76

 69 42 56 39 74 65 58 110 64 60

 53 72 70 52 57 46 43 50 58 78

 73 91 71 85 60 43 34 22 27 45

 43 55 48 59 91 57 48 43 43 42

 86 105 66 117 87 72 77 43 62 27

 63 58 44 64 59 92 112 144 85 118

 115 69 63 93 121 95 129 219 155 129

 96 76 68 43 52 33 58 34 28 41

 41 57 71 60 71 44 76 54 49 31

 50 72 69 83 62 119 77 45 86 54

 42 55 38 60 31 63 46 39 28 40

 57 46 26 44 51 43 44 31 28 42

 34 37 33 54 42 33 21 31 31 27

 56 75 40 23 22 62 40 40 32 29

 16 53 28 31 33 30 39

Comment - DMB 05-10-99 measurement in 1/50mm

Start Date: AD 110

End Date: AD 336

BALLINDERRY, CO. ANTRIM

Q9885

206

 33 24 27 33 26 26 29 37 26 44

 25 33 60 53 48 41 28 14 24 20

 15 24 44 34 39 38 49 58 53 48

 43 50 54 62 43 40 58 82 78 53

 48 31 17 24 30 60 100 104 142 121

 107 91 87 104 114 147 138 146 179 130

 142 148 99 138 85 81 76 41 127 180

 168 260 199 150 107 108 89 79 140 184

 151 103 132 144 73 80 49 45 38 40

 42 49 31 34 31 37 44 57 46 46

 40 51 50 58 47 40 79 128 97 98

 93 79 39 71 40 63 54 37 51 29

 64 61 58 35 51 57 55 30 85 89

 43 48 31 31 34 46 86 138 143 85

 86 32 63 68 60 90 138 131 104 87

 136 126 143 87 83 38 96 133 169 118

 94 80 52 62 86 52 46 138 80 49

 29 85 167 142 191 160 110 103 183 229

 176 85 64 153 275 165 127 84 123 88

 143 116 114 97 87 171 165 127 72 55

 49 53 53 62 76 79

Comment - DMB 05-10-99 measurement in 1/50mm

Start Date: AD 175

End Date: AD 380

BALLINDERRY, CO. ANTRIM

Q9886

212

 78 47 48 36 48 48 56 49 95 77

 90 77 102 72 81 47 60 49 64 60

 74 59 45 73 57 63 73 34 44 21

 14 22 13 51 28 33 29 66 63 55

 59 85 66 54 45 30 35 33 49 39

 68 44 66 78 105 65 67 53 64 99

 87 43 55 55 47 68 111 155 115 128

 120 89 99 81 77 101 42 50 59 55

 95 76 91 150 80 67 65 90 118 110

 154 143 94 101 133 122 139 127 87 74

 65 46 33 28 32 49 61 85 106 98

 98 72 72 130 102 107 134 103 67 77

 80 79 78 70 115 97 108 105 66 106

 131 98 101 85 44 44 46 60 65 89

 100 107 89 73 84 50 72 49 39 39

 38 28 25 24 21 32 32 39 53 46

 49 37 52 47 58 42 51 58 70 52

 71 69 58 31 36 36 35 30 25 35

 39 41 42 38 33 39 46 56 35 69

 66 46 51 34 33 54 65 70 53 75

 46 36 33 35 59 54 74 57 43 33

 33 31

Comment - DMB 30-09-99 measurement in 1/50mm

Start Date: AD 114

End Date: AD 325

BALLINDERRY, CO. ANTRIM

Q9888

258

 48 36 46 36 68 73 44 36 44 30

 44 49 27 32 34 52 64 64 40 60

 35 55 26 30 26 41 56 52 73 64

 62 59 58 56 44 52 21 19 28 51

 53 70 43 66 110 111 88 87 91 68

 59 99 93 71 57 65 80 132 94 138

 144 128 110 125 101 85 84 108 104 111

 71 58 75 109 141 127 116 102 97 61

 53 50 85 74 51 67 53 97 82 122

 143 79 76 61 69 112 87 76 71 87

 87 107 85 75 70 47 59 59 41 32

 16 11 20 23 27 25 36 74 62 45

 41 52 44 71 66 64 91 76 77 74

 68 42 38 73 86 61 74 52 71 78

 89 63 64 49 53 48 47 42 46 73

 73 97 68 55 29 30 34 28 29 22

 18 19 21 32 35 36 33 42 47 54

 49 48 24 41 52 67 52 50 52 47

 27 70 51 36 40 25 34 31 55 42

 48 29 43 42 65 65 64 72 50 46

 38 29 52 52 63 73 73 57 52 23

 52 40 32 60 49 56 38 29 41 38

 41 30 25 13 27 31 35 33 51 38

 31 38 34 29 24 32 36 42 30 36

 53 70 93 56 47 38 29 26 17 25

 36 35 39 42 43 73 117 120

Comment - DMB 30-09-99 measurement in 1/50mm

Start Date: AD 107

End Date: AD 364

**References**

Baillie MGL. 1982. Tree-ring dating and archaeology. London: Croom Helm.

Munro MAR. 1984. An improved algorithm for crossdating tree-ring series. Tree-Ring Bulletin 44:17−27