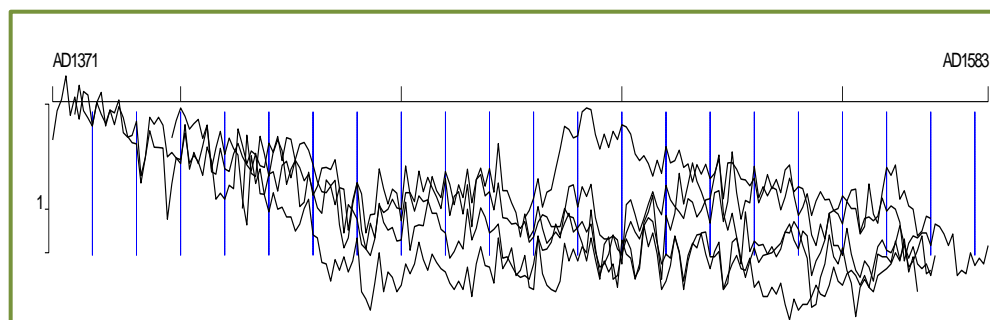

Dendrokronologisk undersøgelse af prøver udtaget fra tømmer fremkommet ved arkæologisk udgravning i Oslo, "Bispegata Kollektivtiltak" II

NNU Rapport 4 – 2021

Claudia Baittinger og Niels Bonde



Årringskurver som indgår i middelkurve n3302m21

Nationalmuseet
Bevaring og Naturvidenskab
Miljøarkæologi og Materialeforskning
Dendrokronologi

Oslo, Norge

”Bispegata Kollektivtiltak”

Fylke: Oslo

Kommune: Oslo

Gnr./Bnr.: 250/45

Koordinater: 59.90824N/10.76807E (EU89)

Opdragsgiver: NIKU ved Michael Derrick og Nationalmuseet

Dendrokronologisk undersøgelse

Formål: Datering

Træart: *Pinus sylvestris* (fyr) og *Picea abies* (gran)

Prøvetagning: NIKU

Laboratorieundersøgelse: Claudia Baittinger, Orla H. Eriksen og Niels Bonde.

NNU j. nr.: A9419. Marts 2021.

Publicering

Resultatet kan frit anvendes ved henvisning til denne rapport. Kontakt evt. laboratoriet for yderligere oplysninger mm. Rapporten kan endvidere lastes ned fra hjemmesiden www.nnuweb.dk, under Dendrokronologi, Rapporter.

Tømmer fra arkæologisk udgravning

I alt er 61 prøver undersøgt. 25 af fyr (*Pinus sylvestris*) og 36 af gran (*Picea abies*), (det. Claudia Baittinger). 34 prøver er dateret.

Prøver af fyr (PISY)

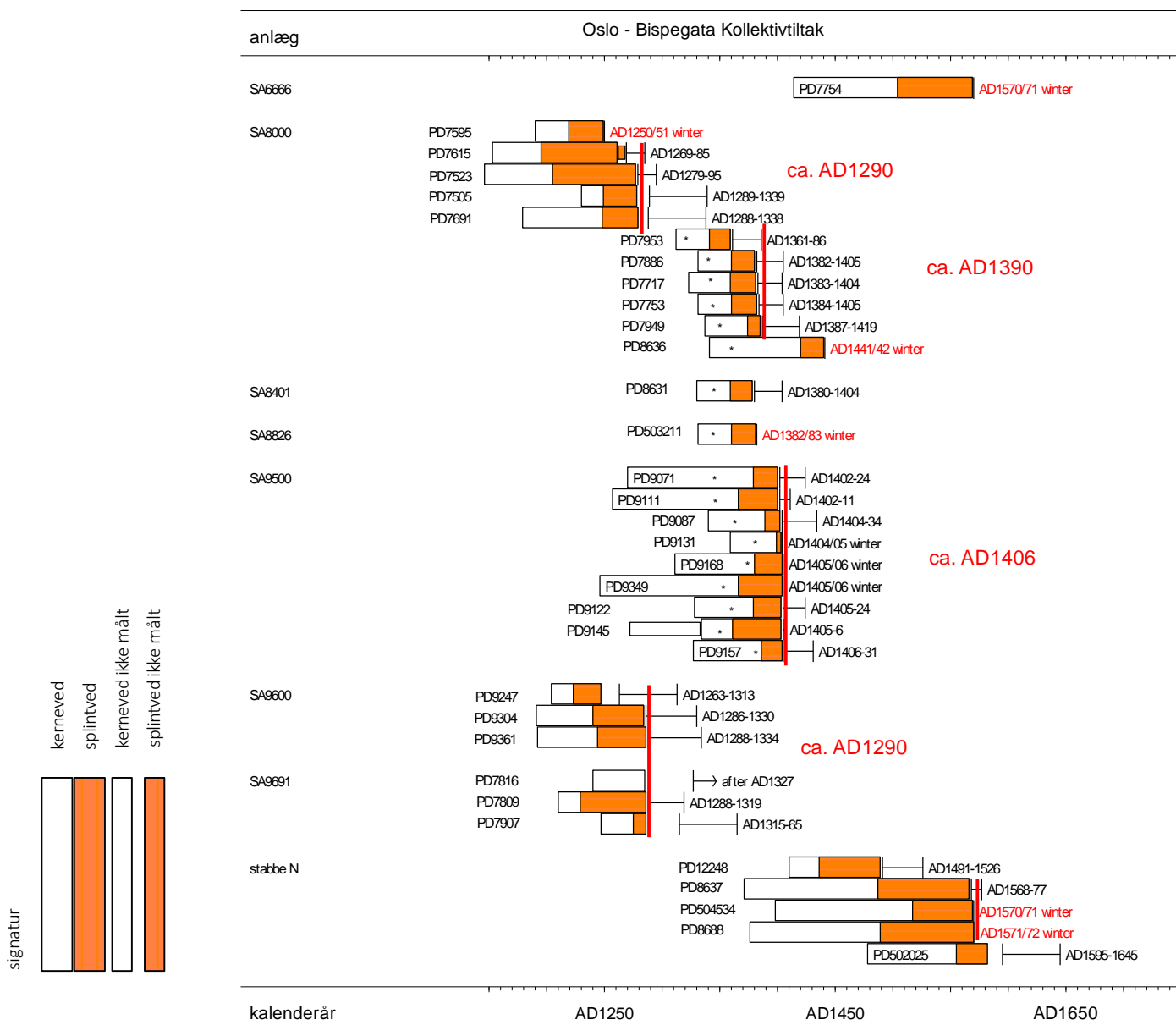
Alle udtaget som tværsnit/skiver. Der er konstateret splintved på 24 prøver. På seks prøver er der konstateret 'Waldkante' (træets sidst dannede årring).

Antallet af årringe i prøverne varierer mellem 33 og 197. **18 prøver er dateret.** For statistiske værdier / beskrivelse med mere vedrørende de enkelte prøver, se katalog.

Prøver af gran (PCAB)

Alle udtaget som tværsnit/skiver. Der er konstateret splintved på alle prøver. På 12 prøver er der konstateret 'Waldkante' (træets sidst dannede årring).

Antallet af årringe i prøverne varierer mellem 28 og 160. **17 prøver er dateret.** For statistiske værdier / beskrivelse med mere vedrørende de enkelte prøver, se katalog.



Dateringsdiagram som omfatter alle de daterede prøver. Prøver markeret med * er af gran.

Åringskurverne fra ni af de daterede prøver (PISY) er sammenregnet til to middelkurver.

n3302m16 består af fire kurver: n3302089, n3302229, n3302239 og n3302639. Kurven er på 135 år som dækker perioden AD1146-1280.

n3302m21 består af fem kurver: n3302019, n3302589, n3302599, n3302609 og n3302619. Kurven er på 213 år og dækker perioden AD1371 - 1583.

kurver	-	-	n3302m16	n3302m21	
-	start	dates	AD1146	AD1371	
-	dates	end	AD1280	AD1583	
n3822m11	AD1057	AD1288	9.72	\	N Bispegata/-allmenning.
PISYOslo02	AD887	AD1291	3.91	\	N PISY Oslo 131 2016
Oslo2014	AD947	AD1554	3.09	7.12	N Oslo 2014 TT

Tabel. Absolut datering. *t*-værdier for krydsdatering med referencekurver for fyrretræ (PISY) fra Norge. For *t*-værdier, se Baillie & Pilcher, 1973.

kurver	-	-	n3302PA2	
-	start	dates	AD1246	
-	dates	end	AD1405	
n3981m21	AD1351	AD1427	4.87	N Oslo Bispevika

2 Tabel. Absolut datering. *t*-værdier for krydsdatering med referencekurver for gran (PCAB) fra Norge. For *t*-værdier, se Baillie & Pilcher, 1973.

Prøverne af gran (PCAB)

Nationalmuseets dendrokronologiske laboratorium råder ikke over tilstrækkelige og velunderbyggede grund-/referencekurver for gran i Norge.

Vi har dog forsøgt at synkronisere de enkelte årringskurver for granprøverne med de tilgængelige grund-/referencekurver for fyrretræ fra Norge samt den i laboratoriet beregnede middelkurver på grundlag af daterede prøver af gran fra Oslo, "Bispevika, B8a", se NNU Rapport 17-2020.

Årringskurverne fra 16 af de daterede prøver (PCAB) er sammenregnet til en middelkurve: **n3302PA02** . Kurven er på 160 år, som dækker perioden AD1246-1405.

Referencer:

Ved undersøgelsen er der, udover laboratoriets egne grund- og referencekurver anvendt kurver, som er stillet til rådighed af Thomas S. Bartholin (Scandinavian Dendro) og Terje Thun (NTNU).

Baillie, M.G.L. & J.R.Pilcher, 1973: A simple cross-dating program for tree-ring research. *Tree-Ring Bulletin* 33, pp. 7-14.

Beregning af middelkurver

n3302m16 (PISY)

Of type W 5 R
Dated AD1146 to AD1280

Contains the following files

n3302089.d dated AD1153 to AD1262 of type R 67
n3302229.d dated AD1230 to AD1279 of type R 30
n3302239.d dated AD1190 to AD1250 of type R 31
n3302339.d dated AD1146 to AD1278 of type R 73
n3302639.d dated AD1179 to AD1280 of type R 32

n3302m21 (PISY)

Of type W 5 R
Dated AD1371 to AD1583

Contains the following files

N3302019.d dated AD1414 to AD1570 of type R 66
N3302589.d dated AD1371 to AD1567 of type R 80
n3302599.d dated AD1376 to AD1571 of type R 82
n3302609.d dated AD1398 to AD1570 of type R 53
n3302619.d dated AD1478 to AD1583 of type R 28

n3302PA2 (PCAB)

Dated AD1246 to AD1405

Contains the following files

\Picea\N3302039.d dated AD1331 to AD1383 of type R 23 N
\Picea\N3302049.d dated AD1331 to AD1381 of type R 21 N
\Picea\N3302119.d dated AD1323 to AD1382 of type R 23 N
\Picea\N3302129.d dated AD1312 to AD1360 of type R 19 N
\Picea\N3302139.d dated AD1337 to AD1386 of type R 12 N
\Picea\N3302379.d dated AD1330 to AD1379 of type R 20 N
\Picea\N3302389.d dated AD1331 to AD1382 of type R 22 W
\Picea\N3302409.d dated AD1328 to AD1404 of type R 25 N
\Picea\N3302419.d dated AD1359 to AD1404 of type R 5 W
\Picea\N3302429.d dated AD1334 to AD1404 of type R 43 N
\Picea\N3302439.d dated AD1327 to AD1405 of type R 19 N
\Picea\N3302449.d dated AD1311 to AD1405 of type R 25 W
\Picea\N3302459.d dated AD1246 to AD1405 of type R 39 W
\Picea\N3302469.d dated AD1270 to AD1401 of type R 22 N
\Picea\N3302479.d dated AD1340 to AD1403 of type R 14 N
\Picea\N3302489.d dated AD1257 to AD1401 of type R 35 N

Katalog

N3302019.d

A9419 Bispegata PD7754

Raw Ring-width PISY data of 157 years length

Dated AD1414 to AD1570

66 sapwood rings and winter bark surface

Average ring width 102.40 Sensitivity 0.25

Interpretation: AD1570/71 winter

N3302029.d

A9419 Bispegata; PD7708

Raw Ring-width PCAB data of 47 years length

Undated; relative dates - 0 to 46

23 sapwood rings and no bark surface

Average ring width 252.51 Sensitivity 0.13

N3302039.d

A9419 Bispegata; PD7753

Raw Ring-width PCAB data of 53 years length

Dated AD1331 to AD1383

23 sapwood rings and no bark surface

Average ring width 222.68 Sensitivity 0.19

Interpretation: AD1384-1405

N3302049.d

A9419 Bispegata; PD7886

Raw Ring-width PCAB data of 51 years length

Dated AD1331 to AD1381

21 sapwood rings and no bark surface

Average ring width 183.92 Sensitivity 0.14

Interpretation: AD1382-1405

n3302059.d

A9419 Bispegata; PD502420

Raw Ring-width PISY data of 33 years length

Undated; relative dates - 1 to 33

23 sapwood rings and no bark surface

Average ring width 344.85 Sensitivity 0.28

n3302069

PD8987. Prøve ikke modtaget

N3302079.d

A9419 Bispegata; PD7586

Raw Ring-width PCAB data of 36 years length

Undated; relative dates - 1 to 36

13 sapwood rings and no bark surface

Average ring width 351.47 Sensitivity 0.21

n3302089.d
 A9419 Bispegata; PD7615
 Raw Ring-width PISY data of 110 years length
 Dated AD1153 to AD1262
 67 sapwood rings and no bark surface
 Average ring width 95.99 Sensitivity 0.23
 Interpretation: AD1269-85

N3302099.d
 A9419 Bispegata; PD7957
 Raw Ring-width PCAB data of 57 years length
 Undated; relative dates - 1 to 57
 14 sapwood rings and no bark surface
 Average ring width 249.49 Sensitivity 0.31

N3302109.d
 A9419 Bispegata; PD7956
 Raw Ring-width PCAB data of 32 years length
 Undated; relative dates - 1 to 32
 8 sapwood rings and winter bark surface
 Average ring width 416.75 Sensitivity 0.18

N3302119.d
 A9419 Bispegata; PD7717
 Raw Ring-width PCAB data of 60 years length
 Dated AD1323 to AD1382
 23 sapwood rings and no bark surface
 Average ring width 184.20 Sensitivity 0.14
 Interpretation: AD1383-1404

N3302129.d
 A9419 Bispegata; PD7953
 Raw Ring-width PCAB data of 49 years length
 Dated AD1312 to AD1360
 19 sapwood rings and no bark surface
 Average ring width 222.47 Sensitivity 0.20
 Interpretation: AD1361-86

N3302139.d
 A9419 Bispegata; PD7949
 Raw Ring-width PCAB data of 50 years length
 Dated AD1337 to AD1386
 12 sapwood rings and no bark surface
 Average ring width 333.82 Sensitivity 0.17
 Interpretation: AD1387-1419

N3302149.d
 A9419 Bispegata; PD7955
 Raw Ring-width PISY data of 68 years length
 Undated; relative dates - 0 to 67
 28 sapwood rings and no bark surface
 Average ring width 120.28 Sensitivity 0.17

n3302159.d
 A9419 Bispegata; PD502419
 Raw Ring-width PISY data of 103 years length
 Undated; relative dates - 1 to 103
 73 sapwood rings and winter bark surface
 Average ring width 86.56 Sensitivity 0.21

N3302169.d
 A9419 Bispegata; PD8636
 Raw Ring-width PCAB data of 101 years length
 Dated AD1341 to AD1441
 21 sapwood rings and winter bark surface
 Average ring width 195.08 Sensitivity 0.15
 Interpretation: AD1441/42 winter

N3302179.d
 A9419 Bispegata; PD8993
 Raw Ring-width PCAB data of 58 years length
 Undated; relative dates - 1 to 58
 30 sapwood rings and no bark surface
 Average ring width 223.05 Sensitivity 0.18

N3302189.d
 A9419 Bispegata; PD9283
 Raw Ring-width PCAB data of 29 years length
 Undated; relative dates - 1 to 29
 10 sapwood rings and winter bark surface
 Average ring width 326.97 Sensitivity 0.19

N3302199.d
 A9419 Bispegata; PD9292
 Raw Ring-width PCAB data of 28 years length
 Undated; relative dates - 1 to 28
 8 sapwood rings and no bark surface
 Average ring width 320.39 Sensitivity 0.17

n3302209.d
 A9419 Bispegata; PD7601
 Raw Ring-width PISY data of 48 years length
 Undated; relative dates - 1 to 48
 28 sapwood rings and no bark surface
 Average ring width 202.40 Sensitivity 0.16

N3302219.d
 A9419 Bispegata; PD7502
 Raw Ring-width PCAB data of 65 years length
 Undated; relative dates - 1 to 65
 29 sapwood rings and no bark surface
 Average ring width 167.60 Sensitivity 0.22

n3302229.d
 A9419 Bispegata; PD7505
 Raw Ring-width PISY data of 50 years length
 Dated AD1230 to AD1279
 30 sapwood rings and no bark surface
 Average ring width 257.54 Sensitivity 0.20
 Interpretation: AD1289-1339

n3302239.d
 A9419 Bispegata; PD7595
 Raw Ring-width PISY data of 61 years length
 Dated AD1190 to AD1250
 31 sapwood rings and winter bark surface
 Average ring width 187.72 Sensitivity 0.18
 Interpretation: AD1250/51 winter

n3302249
 PD 7690. Prøve ikke modtaget

N3302259.d
 A9419 Bispegata; PD9182
 Raw Ring-width PCAB data of 40 years length
 Undated; relative dates - 1 to 40
 10 sapwood rings and no bark surface
 Average ring width 300.80 Sensitivity 0.14

N3302269.d
 A9419 Bispegata; PD9224
 Raw Ring-width PCAB data of 65 years length
 Undated; relative dates - 1 to 65
 15 sapwood rings and no bark surface
 Average ring width 193.68 Sensitivity 0.17

N3302279.d
 A9419 bispegata; PD9240
 Raw Ring-width PISY data of 84 years length
 Undated; relative dates - 0 to 83
 40 sapwood rings and no bark surface
 Average ring width 144.52 Sensitivity 0.20

N3302289.d
 A9419 Bispegata; PD8960
 Raw Ring-width PCAB data of 56 years length
 Undated; relative dates - 1 to 56
 9 sapwood rings and no bark surface
 Average ring width 277.89 Sensitivity 0.20

N3302299.d
 A9419 Bispegata; PD8987
 Raw Ring-width PCAB data of 44 years length
 Undated; relative dates - 1 to 44
 10 sapwood rings and no bark surface
 Average ring width 314.73 Sensitivity 0.19

N3302309.d
 A9419 Bispegata; PD9000
 Raw Ring-width PCAB data of 45 years length
 Undated; relative dates - 1 to 45
 8 sapwood rings and no bark surface
 Average ring width 291.02 Sensitivity 0.14

N3302319.d
 A9419 Bispegata; PD9242
 Raw Ring-width PISY data of 125 years length
 Undated; relative dates - 0 to 124
 35 sapwood rings and no bark surface
 Average ring width 142.18 Sensitivity 0.26

n3302329.d
 A9419 Bispegata; PD9199
 Raw Ring-width PISY data of 154 years length
 Undated; relative dates - 1 to 154
 44 sapwood rings and winter bark surface
 Average ring width 110.97 Sensitivity 0.20

n3302339.d
 A9419 Bispegata; PD7523
 Raw Ring-width PISY data of 133 years length
 Dated AD1146 to AD1278
 73 sapwood rings and no bark surface
 Average ring width 97.22 Sensitivity 0.23
 Interpretation: AD1279-95

N3302349.d
 A9419 Bispegata; PD7804
 Raw Ring-width PCAB data of 62 years length
 Undated; relative dates - 1 to 62
 12 sapwood rings and winter bark surface
 Average ring width 180.42 Sensitivity 0.16

n3302359.d
 A9419 Bispegata; PD8632
 Raw Ring-width PISY data of 63 years length
 Undated; relative dates - 1 to 63
 23 sapwood rings and no bark surface
 Average ring width 170.17 Sensitivity 0.14

N3302369.d
 A9419 Bispegata; PD8634
 Raw Ring-width PCAB data of 54 years length
 Undated; relative dates - 1 to 54
 15 sapwood rings and winter bark surface
 Average ring width 216.07 Sensitivity 0.24

N3302379.d
 A9419 Bispegata; PD8631
 Raw Ring-width PCAB data of 50 years length
 Dated AD1330 to AD1379
 20 sapwood rings and no bark surface
 Average ring width 215.04 Sensitivity 0.14
 Interpretation: AD1380-1404

N3302389.d
 A9419 Bispegata; PD503211
 Raw Ring-width PCAB data of 52 years length
 Dated AD1331 to AD1382
 22 sapwood rings and winter bark surface
 Average ring width 205.69 Sensitivity 0.17
 Interpretation: AD1382/83 winter

N3302399.d
 A9419 Bispegata; PD503213
 Raw Ring-width PCAB data of 37 years length
 Undated; relative dates - 1 to 37
 12 sapwood rings and winter bark surface
 Average ring width 337.97 Sensitivity 0.15

N3302409.d
 A9419 Bispegata; PD9122
 Raw Ring-width PCAB data of 77 years length
 Dated AD1328 to AD1404
 25 sapwood rings and no bark surface
 Average ring width 136.22 Sensitivity 0.19
 Interpretation: AD1405-24

N3302419.d
 A9419 Bispegata; PD9131
 Raw Ring-width PCAB data of 46 years length
 Dated AD1359 to AD1404
 5 sapwood rings and winter bark surface
 Average ring width 273.35 Sensitivity 0.18
 Interpretation: AD1404/05 winter

N3302429.d
 A9419 Bispegata; PD9145
 Raw Ring-width PCAB data of 71 years length
 Dated AD1334 to AD1404
 43 sapwood rings and no bark surface
 Average ring width 156.58 Sensitivity 0.19
 Interpretation: AD1405-6

N3302439.d
 A9419 Bispegata; PD9157
 Raw Ring-width PCAB data of 79 years length
 Dated AD1327 to AD1405
 19 sapwood rings and no bark surface
 Average ring width 174.16 Sensitivity 0.21
 Interpretation: AD1406-31

N3302449.d
 A9419 Bispegata; PD9168
 Raw Ring-width PCAB data of 95 years length
 Dated AD1311 to AD1405
 25 sapwood rings and winter bark surface
 Average ring width 148.61 Sensitivity 0.23
 Interpretation: AD1405/06 winter

N3302459.d
 A9419 Bispegata; PD9349
 Raw Ring-width PCAB data of 160 years length
 Dated AD1246 to AD1405
 39 sapwood rings and winter bark surface
 Average ring width 80.21 Sensitivity 0.22
 Interpretation: AD1405/06 winter

N3302469.d
 A9419 Bispegata; PD9071
 Raw Ring-width PCAB data of 132 years length
 Dated AD1270 to AD1401
 22 sapwood rings and no bark surface
 Average ring width 83.02 Sensitivity 0.22
 Interpretation: AD1402-24

N3302479.d
 A9419 Bispegata; PD9087
 Raw Ring-width PCAB data of 64 years length
 Dated AD1340 to AD1403
 14 sapwood rings and no bark surface
 Average ring width 211.28 Sensitivity 0.17
 Interpretation: AD1404-34

N3302489.d
 A9419 Bispegata; PD9111
 Raw Ring-width PCAB data of 145 years length
 Dated AD1257 to AD1401
 35 sapwood rings and no bark surface
 Average ring width 92.56 Sensitivity 0.18
 Interpretation: AD1402-11

N3302499.d
 A9419 Bispegata; PD9138
 Raw Ring-width PCAB data of 60 years length
 Undated; relative dates - 1 to 60
 31 sapwood rings and winter bark surface
 Average ring width 261.68 Sensitivity 0.16

N3302509.d
 A9419 Bispegata; PD9304
 Raw Ring-width PISY data of 95 years length
 Dated AD1191 to AD1285
 45 sapwood rings and no bark surface
 Average ring width 130.55 Sensitivity 0.18
 Interpretation: AD1286-1330

N3302519.d
 A9419 Bispegata; PD9341
 Raw Ring-width PCAB data of 59 years length
 Undated; relative dates - 1 to 59
 29 sapwood rings and no bark surface
 Average ring width 228.54 Sensitivity 0.17

N3302529.d
 A9419 Bispegata; PD9247
 Raw Ring-width PISY data of 45 years length
 Dated AD1204 to AD1248
 25 sapwood rings and no bark surface
 Average ring width 190.22 Sensitivity 0.16
 Interpretation: AD1263-1313

N3302539.d
 A9419 Bispegata; PD9361
 Raw Ring-width PISY data of 96 years length
 Dated AD1192 to AD1287
 43 sapwood rings and no bark surface
 Average ring width 122.66 Sensitivity 0.18
 Interpretation: AD1288-1334

N3302549.d
 A9419 Bispegata; PD9438
 Raw Ring-width PCAB data of 71 years length
 Undated; relative dates - 1 to 71
 25 sapwood rings and winter bark surface
 Average ring width 180.97 Sensitivity 0.16

N3302559.d
 A9419 Bispegata; PD7809
 Raw Ring-width PISY data of 78 years length
 Dated AD1210 to AD1287
 58 sapwood rings and no bark surface
 Average ring width 109.90 Sensitivity 0.22
 Interpretation: AD1288-1319

N3302569.d
 A9419 Bispegata; PD7816
 Raw Ring-width PISY data of 47 years length
 Dated AD1240 to AD1286
 0 sapwood rings and no bark surface
 Average ring width 242.21 Sensitivity 0.18
 Interpretation: after AD1327

N3302579.d
 A9419 Bispegata; PD7907
 Raw Ring-width PISY data of 41 years length
 Dated AD1247 to AD1287
 12 sapwood rings and no bark surface
 Average ring width 178.59 Sensitivity 0.11
 Interpretation: AD1315-65

N3302589.d
 A9419 Bispegata; PD8637
 Raw Ring-width PISY data of 197 years length
 Dated AD1371 to AD1567
 80 sapwood rings and no bark surface
 Average ring width 131.08 Sensitivity 0.22
 Interpretation: AD1568-77

n3302599.d
 A9419 Bispegata; PD8688
 Raw Ring-width PISY data of 196 years length
 Dated AD1376 to AD1571
 82 sapwood rings and winter bark surface
 Average ring width 131.61 Sensitivity 0.24
 Interpretation: AD1571/72 winter

n3302609.d
 A9419 Bispegata; PD504534
 Raw Ring-width PISY data of 173 years length
 Dated AD1398 to AD1570
 53 sapwood rings and winter bark surface
 Average ring width 101.60 Sensitivity 0.27
 Interpretation: AD1570/71 winter

n3302619.d
 A9419 Bispegata; PD502025
 Raw Ring-width PISY data of 106 years length
 Dated AD1478 to AD1583
 28 sapwood rings and no bark surface
 Average ring width 158.58 Sensitivity 0.18
 Interpretation: AD1595-1645

N330262A.d
 A9419 Bispegata; PD12248
 Raw Ring-width PISY data of 81 years length
 Dated AD1410 to AD1490
 54 sapwood rings and no bark surface
 Average ring width 119.26 Sensitivity 0.26
 Interpretation: AD1491-1526

n3302639.d
 A9419 Bispegata; PD7691
 Raw Ring-width PISY data of 102 years length
 Dated AD1179 to AD1280
 32 sapwood rings and no bark surface
 Average ring width 114.53 Sensitivity 0.22
 Interpretation: AD1288-1338