APPENDIX

Table 1: *Details of the cross-matched samples from Timahoe West* (B = bark edge)

|  |  |  |  |
| --- | --- | --- | --- |
| Sample | Rings | Sapwood Rings | Absolute Dating (BC) |
| Q6676 | 275 | - | 1807-1533 BC |
| Q5651M | 201 | 23 B | 1584-1384 BC |
| Q6428 | 200 | - | 1729-1530 BC |
| Q6427 | 188 | - | 1700–1513 BC |
| Q5656 | 170 | - | 1679-1510 BC |
| Q5654 | 168 | 17 | 1555–1388 BC |
| Q5653 | 164 | - | 1715–1552 BC |
| Q5652 | 160 | 15 | 1557–1398 BC |
| Q5660 | 156 | - | 1659-1504 BC |
| Q6429 | 153 | - | 1686-1534 BC |
| Q5659 | 127 | 30 | 1512-1386 BC |
| Q6669 | 122 | 8 | 1526-1405 BC |
| Q6679 | 112 | - | 1632-1521 BC |
| Q6674 | 110 | - | 1653-1544 BC |
| Q6672 | 108 | - | 1517-1410 BC |
| Q6673 | 100 | - | 1585-1486 BC |
| Q5655 | 88 | - | 1703-1616 BC |
| Q6678 | 85 | - | 1550-1466 BC |
| Q6670 | 79 | - | 1563-1485 BC |
| Q6671 | 65 | - | 1536-1472 BC |
| Q6416M | 61 | 14 B | 1543-1483 BC |

Table 2. t*-value matrix for ring-width series in the Timahoe West site chronology* (- = no correlation value; nsm = non-significant match; nh = not highest match; \* = significant match; \*\*= very significant match; \*\*\*= extremely significant match)



Table 3. *Correlation values for the 424-year Timahoe West site chronology with other site and regional chronologies from Ireland*(\*\*\*= extremely significant match; \*\*= very significant match)

|  |  |  |
| --- | --- | --- |
| Site or master chronology | Start and end date of chronology | Correlation value with Timahoe West |
| Kilmacshane, Co. Galway | 1694BC – 1499BC | t = 8.39\*\*\* |
| Charlemont, Co. Armagh | 1796BC – 1019BC | t = 8.26\*\*\* |
| Derryville, Co. Tipperary | 1724BC – 1574BC | t = 7.99\*\*\* |
| Drinagh, Co. Offaly | 1632BC – 1411BC | t = 7.68\*\*\* |
| Corlona, Co. Leitrim | 1714BC – 1524BC | t = 7.01\*\*\* |
| Ballykean Bog, Co. Offaly | 1744BC – 1457BC | t = 6.88\*\*\* |
| Derryfadda, Co. Tipperary | 1776BC – 1472BC | t = 6.62\*\*\* |
| Garry Bog, Co. Antrim | 2516BC – 975BC | t = 6.41\*\*\* |
| Bronzez Mk 9, Germany | 2034BC – 1295BC | t = 5.24\*\* |
| Northern English Mean | 3907BC – 323BC | t = 5.21\*\* |

Table 4: Radiocarbon determinations from Irish oaks ETH and AA (full comparative data-set including oak data previously published by Pearson et al 2018 and extended for AA in this study)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lab number** | **Tree number** | **14C Age (BP)** | **+/-** | **Calendar year (BP)** |
| ETH-90759 | Q5654 | 3381 | 12 | 3629 |
| ETH-90758 | Q5654 | 3399 | 16 | 3628 |
| AA110975 | Q6427 | 3379 | 21 | 3628 |
| ETH-90757 | Q5654 | 3391 | 15 | 3627 |
| AA110974 | Q6427 | 3365 | 21 | 3627 |
| ETH-90756 | Q5654 | 3391 | 16 | 3626 |
| AA110973 | Q6427 | 3383 | 21 | 3626 |
| ETH-90755 | Q5654 | 3386 | 12 | 3625 |
| AA110972 | Q6427 | 3392 | 22 | 3625 |
| ETH-90754 | Q5654 | 3367 | 15 | 3624 |
| AA110565 | Q6427 | 3376 | 22 | 3624 |
| ETH-90753 | Q5654 | 3383 | 16 | 3623 |
| AA110564 | Q6427 | 3369 | 22 | 3623 |
| ETH-90752 | Q5654 | 3379 | 16 | 3622 |
| AA110563 | Q6427 | 3378 | 29 | 3622 |
| ETH-90751 | Q5654 | 3362 | 15 | 3621 |
| AA110562 | Q6427 | 3374 | 25 | 3621 |
| ETH-90750 | Q5654 | 3384 | 12 | 3620 |
| AA110561 | Q6427 | 3404 | 27 | 3620 |
| ETH-90749 | Q5654 | 3389 | 16 | 3619 |
| AA110560 | Q6427 | 3374 | 28 | 3619 |
| ETH-90748 | Q5654 | 3374 | 15 | 3618 |
| AA110559 | Q6427 | 3380 | 22 | 3618 |
| ETH-90747 | Q5654 | 3392 | 15 | 3617 |
| ETH-90746 | Q5654 | 3372 | 12 | 3616 |
| ETH-90745 | Q5654 | 3375 | 15 | 3615 |
| AA109463 | Q6427 | 3333 | 21 | 3615 |
| ETH-90744 | Q5654 | 3391 | 16 | 3614 |
| AA109462 | Q6427 | 3359 | 21 | 3614 |
| ETH-90743 | Q5654 | 3379 | 15 | 3613 |
| AA109461 | Q6427 | 3349 | 21 | 3613 |
| ETH-90742 | Q5654 | 3367 | 15 | 3612 |
| AA109460 | Q6427 | 3333 | 22 | 3612 |
| ETH-90741 | Q5654 | 3386 | 12 | 3611 |
| AA109459 | Q6427 | 3366 | 21 | 3611 |
| ETH-90740 | Q5654 | 3385 | 16 | 3610 |
| AA108998 | Q6427 | 3370 | 21 | 3610 |
| ETH-90739 | Q5654 | 3379 | 14 | 3609 |
| AA108997 | Q6427 | 3377 | 26 | 3609 |
| ETH-90598 | Q6427 | 3371 | 15 | 3609 |
| ETH-90738 | Q5654 | 3381 | 12 | 3608 |
| AA108996 | Q6427 | 3381 | 21 | 3608 |
| ETH-90737 | Q5654 | 3380 | 12 | 3607 |
| AA108995 | Q6427 | 3391 | 21 | 3607 |
| ETH-90736 | Q5654 | 3350 | 14 | 3606 |
| AA108994 | Q6427 | 3395 | 21 | 3606 |
| ETH-90735 | Q5654 | 3384 | 15 | 3605 |
| AA108993 | Q6427 | 3403 | 21 | 3605 |
| ETH-90599 | Q6427 | 3373 | 15 | 3605 |
| ETH-90734 | Q5654 | 3394 | 15 | 3604 |
| AA108992 | Q6427 | 3403 | 21 | 3604 |
| ETH-90733 | Q5654 | 3380 | 15 | 3603 |
| AA108991 | Q6427 | 3359 | 24 | 3603 |
| ETH-90732 | Q5654 | 3381 | 12 | 3602 |
| AA108915 | Q6427 | 3380 | 20 | 3602 |
| ETH-90731 | Q5654 | 3396 | 16 | 3601 |
| AA108914 | Q6427 | 3367 | 23 | 3601 |
| ETH-90600 | Q6427 | 3364 | 15 | 3601 |
| ETH-90730 | Q5654 | 3369 | 15 | 3600 |
| AA108913 | Q6427 | 3391 | 23 | 3600 |
| ETH-90729 | Q5654 | 3377 | 16 | 3599 |
| AA108912 | Q6427 | 3402 | 22 | 3599 |
| ETH-90728 | Q5654 | 3389 | 12 | 3598 |
| AA108911 | Q6427 | 3412 | 23 | 3598 |
| ETH-90727 | Q5654 | 3387 | 15 | 3597 |
| AA108910 | Q6427 | 3385 | 23 | 3597 |
| ETH-90601 | Q6427 | 3398 | 15 | 3597 |
| ETH-90726 | Q5654 | 3397 | 16 | 3596 |
| AA108909 | Q6427 | 3445 | 19 | 3596 |
| ETH-90725 | Q5654 | 3383 | 16 | 3595 |
| AA108908 | Q6427 | 3397 | 19 | 3595 |
| ETH-90724 | Q5654 | 3392 | 15 | 3594 |
| AA108907 | Q6427 | 3411 | 21 | 3594 |
| ETH-90723 | Q5654 | 3373 | 12 | 3593 |
| AA108906 | Q6427 | 3381 | 20 | 3593 |
| ETH-90602 | Q6427 | 3378 | 15 | 3593 |
| ETH-90722 | Q5654 | 3389 | 16 | 3592 |
| AA108905 | Q6427 | 3401 | 23 | 3592 |
| ETH-90721 | Q5654 | 3372 | 15 | 3591 |
| AA108904 | Q6427 | 3401 | 19 | 3591 |
| ETH-90720 | Q5654 | 3382 | 14 | 3590 |
| AA108903 | Q6427 | 3385 | 21 | 3590 |
| ETH-90719 | Q5654 | 3371 | 11 | 3589 |
| AA108902 | Q6427 | 3411 | 19 | 3589 |
| ETH-90603 | Q6427 | 3362 | 15 | 3589 |
| ETH-90718 | Q5654 | 3374 | 14 | 3588 |
| AA108901 | Q6427 | 3390 | 20 | 3588 |
| ETH-90717 | Q5654 | 3402 | 14 | 3587 |
| AA108900 | Q6427 | 3384 | 19 | 3587 |
| ETH-90716 | Q5654 | 3398 | 14 | 3586 |
| AA108990 | Q6427 | 3379 | 20 | 3586 |
| ETH-90715 | Q5654 | 3371 | 15 | 3585 |
| AA108989 | Q6427 | 3367 | 19 | 3585 |
| ETH-90604 | Q6427 | 3377 | 15 | 3585 |
| ETH-90714 | Q5654 | 3363 | 12 | 3584 |
| AA108988 | Q6427 | 3397 | 19 | 3584 |
| ETH-90713 | Q5654 | 3374 | 14 | 3583 |
| AA108987 | Q6427 | 3394 | 19 | 3583 |
| ETH-90712 | Q5654 | 3380 | 15 | 3582 |
| AA108986 | Q6427 | 3349 | 19 | 3582 |
| ETH-90711 | Q5654 | 3368 | 14 | 3581 |
| AA108985 | Q6427 | 3397 | 19 | 3581 |
| ETH-90605 | Q6427 | 3385 | 15 | 3581 |
| ETH-90710 | Q5654 | 3365 | 11 | 3580 |
| AA108984 | Q6427 | 3417 | 19 | 3580 |
| AA108685 | Q5653 | 3372 | 23 | 3579 |
| ETH-90709 | Q5654 | 3374 | 15 | 3579 |
| AA108686 | Q5653 | 3392 | 22 | 3578 |
| ETH-90708 | Q5654 | 3362 | 14 | 3578 |
| AA108687 | Q5653 | 3378 | 22 | 3577 |
| ETH-90606 | Q5653 | 3356 | 15 | 3577 |
| ETH-90707 | Q5654 | 3370 | 13 | 3577 |
| AA108688 | Q5653 | 3426 | 24 | 3576 |
| ETH-90706 | Q5654 | 3357 | 14 | 3576 |
| AA108689 | Q5653 | 3377 | 20 | 3575 |
| ETH-90705 | Q5654 | 3376 | 14 | 3575 |
| AA108690 | Q5653 | 3371 | 19 | 3574 |
| ETH-90704 | Q5654 | 3347 | 14 | 3574 |
| AA108691 | Q5653 | 3332 | 20 | 3573 |
| ETH-90607 | Q5653 | 3348 | 15 | 3573 |
| ETH-90703 | Q5654 | 3364 | 15 | 3573 |
| AA108692 | Q5653 | 3328 | 24 | 3572 |
| ETH-90702 | Q5654 | 3351 | 14 | 3572 |
| AA108693 | Q5653 | 3359 | 23 | 3571 |
| ETH-90701 | Q5654 | 3365 | 14 | 3571 |
| AA108694 | Q5653 | 3362 | 22 | 3570 |
| ETH-90700 | Q5654 | 3343 | 15 | 3570 |
| AA108695 | Q5653 | 3371 | 24 | 3569 |
| ETH-90608 | Q5653 | 3327 | 15 | 3569 |
| ETH-90699 | Q5654 | 3357 | 14 | 3569 |
| AA108696 | Q5653 | 3331 | 24 | 3568 |
| ETH-90698 | Q5654 | 3335 | 14 | 3568 |
| AA108697 | Q5653 | 3332 | 37 | 3567 |
| ETH-90697 | Q5654 | 3309 | 14 | 3567 |
| AA108184 | Q5653 | 3335 | 23 | 3566 |
| ETH-90696 | Q5654 | 3347 | 14 | 3566 |
| AA108344 | Q5653 | 3325 | 26 | 3565 |
| ETH-90609 | Q5653 | 3330 | 15 | 3565 |
| ETH-90695 | Q5654 | 3331 | 14 | 3565 |
| AA108647 | Q5653 | 3358 | 20 | 3564 |
| ETH-90694 | Q5654 | 3300 | 14 | 3564 |
| AA108646 | Q5653 | 3333 | 21 | 3563 |
| ETH-90693 | Q5654 | 3305 | 14 | 3563 |
| AA108645 | Q5653 | 3320 | 25 | 3562 |
| ETH-90692 | Q5654 | 3295 | 14 | 3562 |
| AA108644 | Q5653 | 3318 | 21 | 3561 |
| ETH-90610 | Q5653 | 3313 | 15 | 3561 |
| ETH-90691 | Q5654 | 3298 | 14 | 3561 |
| AA108643 | Q5653 | 3315 | 21 | 3560 |
| ETH-90690 | Q5654 | 3329 | 14 | 3560 |
| AA108642 | Q5653 | 3325 | 27 | 3559 |
| ETH-90689 | Q5654 | 3312 | 14 | 3559 |
| AA108641 | Q5653 | 3309 | 21 | 3558 |
| ETH-90688 | Q5654 | 3285 | 14 | 3558 |
| AA108640 | Q5653 | 3311 | 21 | 3557 |
| ETH-90611 | Q5653 | 3290 | 15 | 3557 |
| ETH-90687 | Q5654 | 3303 | 14 | 3557 |
| AA108639 | Q5653 | 3306 | 23 | 3556 |
| ETH-90686 | Q5654 | 3309 | 14 | 3556 |
| AA108638 | Q5653 | 3301 | 21 | 3555 |
| ETH-90685 | Q5654 | 3299 | 14 | 3555 |
| AA108637 | Q5653 | 3338 | 21 | 3554 |
| ETH-90684 | Q5654 | 3325 | 14 | 3554 |
| AA108345 | Q5653 | 3305 | 33 | 3553 |
| ETH-90612 | Q5653 | 3297 | 15 | 3553 |
| ETH-90683 | Q5654 | 3321 | 14 | 3553 |
| AA108346 | Q5653 | 3306 | 32 | 3552 |
| ETH-90682 | Q5654 | 3302 | 14 | 3552 |
| AA108347 | Q5653 | 3319 | 48 | 3551 |
| ETH-90681 | Q5654 | 3321 | 14 | 3551 |
| AA108348 | Q5653 | 3328 | 32 | 3550 |
| ETH-90680 | Q5654 | 3319 | 14 | 3550 |
| AA108349 | Q5653 | 3331 | 35 | 3549 |
| ETH-90679 | Q5654 | 3293 | 14 | 3549 |
| AA108350 | Q5653 | 3332 | 34 | 3548 |
| ETH-90678 | Q5654 | 3308 | 14 | 3548 |
| AA108351 | Q5653 | 3304 | 39 | 3547 |
| ETH-90677 | Q5654 | 3328 | 14 | 3547 |
| AA108352 | Q5653 | 3306 | 26 | 3546 |
| ETH-90676 | Q5653 | 3261 | 14 | 3546 |
| AA108353 | Q5653 | 3304 | 25 | 3545 |
| ETH-90675 | Q5653 | 3285 | 14 | 3545 |
| AA108354 | Q5653 | 3298 | 25 | 3544 |
| ETH-90674 | Q5653 | 3295 | 14 | 3544 |
| AA108355 | Q5653 | 3302 | 25 | 3543 |
| ETH-90673 | Q5653 | 3299 | 14 | 3543 |
| AA108356 | Q5653 | 3322 | 21 | 3542 |
| ETH-90672 | Q5653 | 3312 | 14 | 3542 |
| AA108357 | Q5653 | 3303 | 28 | 3541 |
| ETH-90671 | Q5653 | 3312 | 14 | 3541 |
| AA108358 | Q5653 | 3325 | 25 | 3540 |
| ETH-90670 | Q5653 | 3312 | 14 | 3540 |
| AA108359 | Q5653 | 3335 | 25 | 3539 |
| ETH-90669 | Q5653 | 3311 | 14 | 3539 |
| AA108636 | Q5653 | 3310 | 21 | 3538 |
| ETH-90668 | Q5653 | 3305 | 14 | 3538 |
| AA108671 | Q5653 | 3346 | 23 | 3537 |
| ETH-90667 | Q5653 | 3283 | 14 | 3537 |
| AA108672 | Q5653 | 3332 | 24 | 3536 |
| ETH-90666 | Q5653 | 3300 | 14 | 3536 |
| AA108673 | Q5653 | 3320 | 25 | 3535 |
| ETH-90665 | Q5653 | 3316 | 14 | 3535 |
| AA108674 | Q5653 | 3320 | 23 | 3534 |
| ETH-90664 | Q5653 | 3313 | 14 | 3534 |
| AA108675 | Q5653 | 3326 | 24 | 3533 |
| ETH-90663 | Q5653 | 3315 | 12 | 3533 |
| AA108676 | Q5653 | 3304 | 32 | 3532 |
| ETH-90662 | Q5653 | 3296 | 14 | 3532 |
| AA108677 | Q5653 | 3331 | 25 | 3531 |
| ETH-90661 | Q5653 | 3309 | 15 | 3531 |
| AA108678 | Q5653 | 3301 | 47 | 3530 |
| ETH-90660 | Q5653 | 3301 | 14 | 3530 |
| AA108806 | Q5653 | 3334 | 21 | 3529 |
| ETH-90659 | Q5653 | 3316 | 11 | 3529 |
| AA108807 | Q5653 | 3333 | 26 | 3528 |
| ETH-90658 | Q5653 | 3287 | 15 | 3528 |
| AA108808 | Q5653 | 3337 | 21 | 3527 |
| ETH-90657 | Q5653 | 3298 | 14 | 3527 |
| AA108809 | Q5653 | 3291 | 25 | 3526 |
| ETH-90656 | Q5653 | 3286 | 14 | 3526 |
| ETH-90655 | Q5653 | 3306 | 15 | 3525 |
| ETH-90654 | Q5653 | 3302 | 11 | 3524 |
| ETH-90653 | Q5653 | 3317 | 14 | 3523 |
| ETH-90652 | Q5653 | 3315 | 15 | 3522 |
| ETH-90651 | Q5653 | 3321 | 14 | 3521 |
| ETH-90650 | Q5653 | 3323 | 11 | 3520 |
| ETH-90649 | Q5653 | 3331 | 15 | 3519 |
| ETH-90648 | Q5653 | 3332 | 14 | 3518 |
| ETH-90647 | Q5653 | 3344 | 14 | 3517 |
| ETH-90646 | Q5653 | 3315 | 15 | 3516 |
| ETH-90645 | Q5653 | 3312 | 12 | 3515 |
| ETH-90644 | Q5653 | 3334 | 14 | 3514 |
| ETH-90643 | Q5653 | 3307 | 15 | 3513 |
| ETH-90642 | Q5653 | 3323 | 14 | 3512 |
| ETH-90641 | Q5653 | 3330 | 11 | 3511 |
| ETH-90640 | Q5653 | 3324 | 15 | 3510 |
| ETH-90639 | Q5653 | 3341 | 14 | 3509 |
| ETH-90638 | Q5653 | 3310 | 14 | 3508 |
| AA109989 | Q5653 | 3289 | 22 | 3507 |
| ETH-90637 | Q5653 | 3311 | 15 | 3507 |
| AA109846 | Q5653 | 3277 | 23 | 3506 |
| ETH-90636 | Q5653 | 3291 | 14 | 3506 |
| AA109845 | Q5653 | 3303 | 22 | 3505 |
| ETH-90635 | Q5653 | 3337 | 14 | 3505 |
| AA109844 | Q5653 | 3294 | 22 | 3504 |
| ETH-90634 | Q5653 | 3308 | 15 | 3504 |
| ETH-90633 | Q5653 | 3342 | 14 | 3503 |
| ETH-90632 | Q5653 | 3335 | 14 | 3502 |
| ETH-90631 | Q5653 | 3310 | 15 | 3501 |
| ETH-91973 | Q6427 | 3331 | 14 | 3500 |
| ETH-91973 | Q6427 | 3334 | 14 | 3500 |
| ETH-91972 | Q6427 | 3332 | 15 | 3499 |
| ETH-91971 | Q6427 | 3314 | 14 | 3498 |
| ETH-91970 | Q6427 | 3309 | 15 | 3497 |
| ETH-91970 | Q6427 | 3317 | 14 | 3497 |
| ETH-91969 | Q6427 | 3312 | 14 | 3496 |
| AA110572 | Q5654 | 3334 | 24 | 3495 |
| ETH-91968 | Q6427 | 3302 | 14 | 3495 |
| ETH-91967 | Q6427 | 3306 | 14 | 3494 |
| ETH-91967 | Q6427 | 3323 | 14 | 3494 |
| AA110571 | Q5654 | 3322 | 22 | 3493 |
| ETH-91966 | Q5654 | 3313 | 14 | 3493 |
| ETH-91965 | Q5654 | 3309 | 14 | 3492 |
| AA110570 | Q5654 | 3323 | 22 | 3491 |
| ETH-91964 | Q5654 | 3305 | 14 | 3491 |
| ETH-91964 | Q5654 | 3311 | 14 | 3491 |
| ETH-91963 | Q5654 | 3286 | 14 | 3490 |
| AA110569 | Q5654 | 3311 | 22 | 3489 |
| ETH-91962 | Q5654 | 3306 | 15 | 3489 |
| ETH-91961 | Q5654 | 3299 | 14 | 3488 |
| ETH-91961 | Q5654 | 3301 | 14 | 3488 |
| AA110568 | Q5654 | 3303 | 22 | 3487 |
| ETH-91960 | Q5654 | 3283 | 14 | 3487 |
| ETH-91959 | Q5654 | 3280 | 14 | 3486 |
| AA110567 | Q5654 | 3238 | 22 | 3485 |
| ETH-91958 | Q5654 | 3266 | 14 | 3485 |
| ETH-91958 | Q5654 | 3300 | 14 | 3485 |
| ETH-91957 | Q5654 | 3296 | 14 | 3484 |
| AA110566 | Q5654 | 3303 | 22 | 3483 |
| ETH-91956 | Q5654 | 3294 | 14 | 3483 |
| AA109745 | Q5654 | 3276 | 23 | 3482 |
| ETH-91955 | Q5654 | 3290 | 14 | 3482 |
| ETH-91955 | Q5654 | 3305 | 14 | 3482 |
| ETH-91954 | Q5654 | 3284 | 14 | 3481 |
| AA109744 | Q5654 | 3256 | 25 | 3480 |
| ETH-91953 | Q5654 | 3279 | 14 | 3480 |
| ETH-91952 | Q5654 | 3254 | 14 | 3479 |
| ETH-91952 | Q5654 | 3267 | 14 | 3479 |
| AA109479 | Q5654 | 3231 | 24 | 3478 |
| ETH-91951 | Q5654 | 3244 | 14 | 3478 |
| ETH-91950 | Q5654 | 3234 | 14 | 3477 |
| AA109478 | Q5654 | 3263 | 22 | 3476 |
| ETH-91949 | Q5654 | 3241 | 14 | 3476 |
| ETH-91949 | Q5654 | 3257 | 14 | 3476 |
| AA110542 | Q5654 | 3254 | 24 | 3475 |
| ETH-91948 | Q5654 | 3252 | 14 | 3475 |
| AA109477 | Q5654 | 3266 | 22 | 3474 |
| ETH-91947 | Q5654 | 3253 | 14 | 3474 |
| AA110543 | Q5654 | 3275 | 23 | 3473 |
| ETH-91946 | Q5654 | 3261 | 14 | 3473 |
| ETH-91946 | Q5654 | 3301 | 14 | 3473 |
| AA109476 | Q5654 | 3260 | 23 | 3472 |
| ETH-91945 | Q5654 | 3290 | 14 | 3472 |
| ETH-91944 | Q5654 | 3284 | 14 | 3471 |
| AA109475 | Q5654 | 3245 | 22 | 3470 |
| ETH-91943 | Q5654 | 3269 | 14 | 3470 |
| ETH-91943 | Q5654 | 3275 | 14 | 3470 |
| AA110544 | Q5654 | 3272 | 23 | 3469 |
| ETH-91942 | Q5654 | 3271 | 14 | 3469 |
| AA110545 | Q5654 | 3307 | 24 | 3468 |
| ETH-91941 | Q5654 | 3276 | 14 | 3468 |
| AA110546 | Q5654 | 3240 | 23 | 3467 |
| ETH-91940 | Q5654 | 3267 | 14 | 3467 |
| ETH-91940 | Q5654 | 3285 | 14 | 3467 |
| AA109743 | Q5654 | 3223 | 23 | 3466 |
| ETH-91939 | Q5654 | 3253 | 14 | 3466 |
| ETH-91938 | Q5654 | 3243 | 14 | 3465 |
| AA109742 | Q5654 | 3262 | 23 | 3464 |
| ETH-91937 | Q5654 | 3274 | 14 | 3464 |
| ETH-91937 | Q5654 | 3274 | 14 | 3464 |
| ETH-91936 | Q5654 | 3268 | 14 | 3463 |
| AA109741 | Q5654 | 3254 | 22 | 3462 |
| ETH-91935 | Q5654 | 3241 | 14 | 3462 |
| ETH-91934 | Q5654 | 3264 | 14 | 3461 |
| ETH-91934 | Q5654 | 3250 | 14 | 3461 |
| ETH-91933 | Q5654 | 3276 | 14 | 3460 |
| ETH-91932 | Q5654 | 3252 | 14 | 3459 |
| ETH-91931 | Q5654 | 3249 | 14 | 3458 |
| ETH-91931 | Q5654 | 3259 | 14 | 3458 |
| ETH-91930 | Q5654 | 3245 | 14 | 3457 |
| ETH-91929 | Q5654 | 3258 | 14 | 3456 |
| ETH-91928 | Q5654 | 3229 | 14 | 3455 |
| ETH-91928 | Q5654 | 3262 | 14 | 3455 |
| ETH-91927 | Q5654 | 3247 | 14 | 3454 |
| ETH-91926 | Q5654 | 3231 | 14 | 3453 |
| ETH-91925 | Q5654 | 3229 | 14 | 3452 |
| ETH-91925 | Q5654 | 3237 | 14 | 3452 |
| ETH-91924 | Q5654 | 3225 | 14 | 3451 |
| ETH-91923 | Q5654 | 3221 | 14 | 3450 |
| ETH-91922 | Q5654 | 3216 | 14 | 3449 |
| ETH-91922 | Q5654 | 3219 | 14 | 3449 |

Table 5: AA radiocarbon determinations extending the published bristlecone pine sequence (Pearson *et al* 2018) by an additional 20 years.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lab number** | **Tree number** | **14C Age (BP)** | **+/-** | **Calendar year (BP)** |
| AA108078 | SHP-849 | 3219 | 21 | 3449 |
| AA108079 | SHP-849 | 3231 | 22 | 3448 |
| AA108080 | SHP-849 | 3247 | 23 | 3447 |
| AA108081 | SHP-849 | 3231 | 24 | 3446 |
| AA108082 | SHP-849 | 3244 | 22 | 3445 |
| AA109985 | SHP-849 | 3245 | 22 | 3443 |
| AA109986 | SHP-849 | 3265 | 22 | 3442 |
| AA109987 | SHP-849 | 3233 | 39 | 3441 |
| AA109988 | SHP-849 | 3190 | 22 | 3440 |
| AA110332 | SHP-849 | 3188 | 23 | 3439 |
| AA110333 | SHP-849 | 3187 | 24 | 3438 |
| AA110334 | SHP-849 | 3201 | 22 | 3437 |
| AA110335 | SHP-849 | 3178 | 23 | 3436 |
| AA110336 | SHP-849 | 3194 | 27 | 3435 |
| AA110337 | SHP-849 | 3183 | 24 | 3434 |
| AA110363 | SHP-849 | 3227 | 23 | 3433 |
| AA110364 | SHP-849 | 3176 | 23 | 3432 |
| AA110365 | SHP-849 | 3197 | 27 | 3431 |
| AA110366 | SHP-849 | 3190 | 19 | 3430 |
| AA110367 | SHP-849 | 3221 | 24 | 3429 |

Table 6: Radiocarbon determinations from Turkish juniper. Data are provided with an identifier referencing the relative years of the published, securely cross-matched Mediterranean Bronze Age master tree-ring chronology. (see [https://www.ncdc.noaa.gov/paleo/study/3802](https://www.ncdc.noaa.gov/paleo-search/study/3802)). Please note, we would not advocate the use of these data for calibration due to a non-standard approach to the calendar dating (Pearson et al forthcoming).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Lab number** | **Tree number** | **14C Age (BP)** | **+/-** | **Calendar year (BP)** | **Gordion relative year** |
| AA111568 | GOR-161 | 3403 | 28 | 3624 | 834 |
| AA111567 | GOR-161 | 3418 | 23 | 3623 | 835 |
| AA111566 | GOR-161 | 3388 | 22 | 3622 | 836 |
| AA111565 | GOR-161 | 3392 | 22 | 3621 | 837 |
| AA111564 | GOR-161 | 3409 | 26 | 3620 | 838 |
| AA111563 | GOR-161 | 3401 | 22 | 3619 | 839 |
| AA110982 | GOR-161 | 3389 | 21 | 3618 | 840 |
| AA110979 | GOR-161 | 3398 | 23 | 3615 | 841 |
| AA110978 | GOR-161 | 3406 | 21 | 3614 | 842 |
| AA110977 | GOR-161 | 3389 | 21 | 3613 | 843 |
| AA109766 | GOR-76 | 3367 | 30 | 3612 | 844 |
| AA108803 | GOR-76 | 3364 | 24 | 3611 | 845 |
| AA108800 | GOR-76 | 3402 | 24 | 3610 | 846 |
| AA108804 | GOR-76 | 3403 | 21 | 3609 | 847 |
| AA108801 | GOR-76 | 3399 | 21 | 3608 | 848 |
| AA108805 | GOR-76 | 3429 | 21 | 3607 | 849 |
| AA108766 | GOR-76 | 3416 | 23 | 3606 | 850 |
| AA109070 | GOR-76 | 3365 | 26 | 3605 | 851 |
| AA108802 | GOR-76 | 3405 | 21 | 3604 | 852 |
| AA109021 | GOR-76 | 3370 | 21 | 3603 | 853 |
| AA109022 | GOR-76 | 3382 | 23 | 3602 | 854 |
| AA108767 | GOR-76 | 3427 | 23 | 3601 | 855 |
| AA109023 | GOR-76 | 3409 | 20 | 3600 | 856 |
| AA109071 | GOR-76 | 3367 | 23 | 3599 | 857 |
| AA109072 | GOR-76 | 3388 | 23 | 3598 | 858 |
| AA109073 | GOR-76 | 3370 | 24 | 3597 | 859 |
| AA108768 | GOR-76 | 3436 | 23 | 3596 | 860 |
| AA109767 | GOR-76 | 3400 | 29 | 3595 | 861 |
| AA109768 | GOR-76 | 3380 | 22 | 3594 | 862 |
| AA109769 | GOR-76 | 3441 | 23 | 3593 | 863 |
| AA109770 | GOR-76 | 3367 | 22 | 3592 | 864 |
| AA108769 | GOR-76 | 3405 | 23 | 3591 | 865 |
| AA109771 | GOR-76 | 3356 | 22 | 3590 | 866 |
| AA109772 | GOR-76 | 3380 | 25 | 3589 | 867 |
| AA109773 | GOR-76 | 3395 | 23 | 3588 | 868 |
| AA109774 | GOR-76 | 3394 | 37 | 3587 | 869 |
| AA108770 | GOR-76 | 3394 | 23 | 3586 | 870 |
| AA109775 | GOR-76 | 3372 | 31 | 3585 | 871 |
| AA109776 | GOR-76 | 3411 | 27 | 3584 | 872 |
| AA109777 | GOR-76 | 3397 | 39 | 3583 | 873 |
| AA108707 | GOR-76 | 3380 | 25 | 3582 | 874 |
| AA108708 | GOR-76 | 3374 | 27 | 3581 | 875 |
| AA108709 | GOR-76 | 3395 | 25 | 3580 | 876 |
| AA108710 | GOR-76 | 3380 | 26 | 3579 | 877 |
| AA108711 | GOR-76 | 3326 | 28 | 3578 | 878 |
| AA109074 | GOR-76 | 3372 | 24 | 3577 | 879 |
| AA108763 | GOR-76 | 3370 | 28 | 3576 | 880 |
| AA111069 | GOR-76 | 3395 | 21 | 3575 | 881 |
| AA111548 | GOR-76 | 3450 | 22 | 3574 | 882 |
| AA111070 | GOR-76 | 3294 | 20 | 3573 | 883 |
| AA111071 | GOR-76 | 3373 | 20 | 3572 | 884 |
| AA108780 | GOR-76 | 3372 | 21 | 3571 | 885 |
| AA111072 | GOR-76 | 3381 | 20 | 3570 | 886 |
| AA111073 | GOR-76 | 3404 | 21 | 3569 | 887 |
| AA111074 | GOR-76 | 3349 | 24 | 3568 | 888 |
| AA111075 | GOR-76 | 3317 | 20 | 3567 | 889 |
| AA108781 | GOR-76 | 3302 | 24 | 3566 | 890 |
| AA111076 | GOR-76 | 3303 | 20 | 3565 | 891 |
| AA111077 | GOR-76 | 3333 | 20 | 3564 | 892 |
| AA111078 | GOR-76 | 3346 | 24 | 3563 | 893 |
| AA111079 | GOR-76 | 3354 | 21 | 3562 | 894 |
| AA111080 | GOR-76 | 3346 | 25 | 3561 | 895 |
| AA111081 | GOR-76 | 3346 | 27 | 3560 | 896 |
| AA111082 | GOR-76 | 3363 | 24 | 3559 | 897 |
| AA111083 | GOR-76 | 3358 | 24 | 3558 | 898 |
| AA111084 | GOR-76 | 3336 | 26 | 3557 | 899 |
| AA111085 | GOR-76 | 3350 | 29 | 3556 | 900 |
| AA111086 | GOR-76 | 3358 | 24 | 3555 | 901 |
| AA111087 | GOR-76 | 3309 | 24 | 3554 | 902 |
| AA111088 | GOR-76 | 3200 | 21 | 3553 | 903 |
| AA111089 | GOR-76 | 3302 | 24 | 3552 | 904 |
| AA111090 | GOR-76 | 3338 | 25 | 3551 | 905 |
| AA111091 | GOR-76 | 3285 | 28 | 3550 | 906 |
| AA111092 | GOR-76 | 3260 | 24 | 3549 | 907 |
| AA111093 | GOR-76 | 3293 | 24 | 3548 | 908 |
| AA111094 | GOR-76 | 3255 | 24 | 3547 | 909 |
| AA111095 | GOR-76 | 3328 | 22 | 3546 | 910 |
| AA111096 | GOR-76 | 3324 | 21 | 3545 | 911 |
| AA111097 | GOR-76 | 3326 | 27 | 3544 | 912 |
| AA111098 | GOR-76 | 3317 | 25 | 3543 | 913 |
| AA111099 | GOR-76 | 3304 | 21 | 3542 | 914 |
| AA111100 | GOR-76 | 3339 | 20 | 3541 | 915 |
| AA111549 | GOR-76 | 3356 | 21 | 3540 | 916 |
| AA111550 | GOR-76 | 3352 | 21 | 3539 | 917 |
| AA111551 | GOR-76 | 3312 | 22 | 3538 | 918 |
| AA111552 | GOR-76 | 3390 | 21 | 3537 | 919 |
| AA111553 | GOR-76 | 3327 | 22 | 3536 | 920 |
| AA111554 | GOR-76 | 3359 | 24 | 3535 | 921 |
| AA111555 | GOR-76 | 3365 | 24 | 3534 | 922 |
| AA110971 | GOR-76 | 3282 | 21 | 3533 | 923 |
| AA110970 | GOR-76 | 3315 | 23 | 3532 | 924 |
| AA110969 | GOR-76 | 3322 | 21 | 3531 | 925 |
| AA110968 | GOR-76 | 3291 | 22 | 3530 | 926 |

Table 7: Raw ring-width series of Kauri sample GIB102 marked as historical BC.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| GIB102 | -1718 |  |  | 168 | 142 | 116 | 119 | 104 | 90 | 87 | 58 |
| GIB102 | -1710 | 85 | 35 | 35 | 45 | 48 | 110 | 99 | 109 | 51 | 149 |
| GIB102 | -1700 | 130 | 177 | 160 | 89 | 140 | 86 | 163 | 112 | 94 | 142 |
| GIB102 | -1690 | 75 | 145 | 92 | 100 | 65 | 207 | 94 | 127 | 57 | 147 |
| GIB102 | -1680 | 83 | 74 | 71 | 110 | 50 | 82 | 56 | 38 | 58 | 89 |
| GIB102 | -1670 | 57 | 75 | 19 | 88 | 59 | 99 | 24 | 132 | 80 | 82 |
| GIB102 | -1660 | 63 | 49 | 127 | 57 | 117 | 85 | 133 | 82 | 62 | 34 |
| GIB102 | -1650 | 105 | 111 | 58 | 87 | 53 | 119 | 88 | 132 | 68 | 90 |
| GIB102 | -1640 | 53 | 52 | 62 | 55 | 54 | 10 | 80 | 29 | 70 | 74 |
| GIB102 | -1630 | 17 | 79 | 64 | 24 | 71 | 31 | 48 | 32 | 46 | 39 |
| GIB102 | -1620 | 46 | 45 | 65 | 13 | 60 | 55 | 102 | 105 | 34 | 81 |
| GIB102 | -1610 | 30 | 84 | 93 | 106 | 30 | 95 | 135 | 88 | 112 | 62 |
| GIB102 | -1600 | 115 | 78 | 91 | 102 | 116 | 42 | 149 | 125 | 135 | 78 |
| GIB102 | -1590 | 132 | 75 | 108 | 77 | 50 | 90 | 98 | 72 | 137 | 200 |
| GIB102 | -1580 | 94 | 185 | 132 | 136 | 88 | 36 | 66 | 72 | 43 | 174 |
| GIB102 | -1570 | 155 | 119 | 62 | 71 | 26 | 116 | 130 | 44 | 107 | 50 |
| GIB102 | -1560 | 102 | 117 | 85 | 35 | 89 | 50 | 93 | 155 | 128 | 120 |
| GIB102 | -1550 | 217 | 182 | 113 | 112 | 82 | 57 | 120 | 33 | 171 | 157 |
| GIB102 | -1540 | 95 | 192 | 81 | 128 | 98 | 47 | 142 | 119 | 114 | 70 |
| GIB102 | -1530 | 195 | 169 | 110 | 122 | 102 | 92 | 72 | 34 | 179 | 122 |
| GIB102 | -1520 | 102 | 113 | 40 | 118 | 109 | 60 | 53 | 46 | 47 | 72 |
| GIB102 | -1510 | 40 | 70 | 99 | 80 | 37 | 103 | 109 | 38 | 68 | 84 |
| GIB102 | -1500 | 85 | 62 | 50 | 30 | 68 | 59 | 42 | 57 | 76 | 31 |
| GIB102 | -1490 | 87 | 86 | 41 | 89 | 61 | 31 | 40 | 34 | 31 | 63 |
| GIB102 | -1480 | 16 | 86 | 70 | 129 | 140 | 55 | 112 | 109 | 82 | 95 |
| GIB102 | -1470 | 74 | 47 | 121 | 132 | 104 | 107 | 112 | 61 | 123 | 52 |
| GIB102 | -1460 | 131 | 88 | 45 | 82 | 93 | 82 | 109 | 59 | 66 | 84 |
| GIB102 | -1450 | 71 | 45 | 47 | 62 | 74 | 83 | 29 | 75 | 62 | 89 |
| GIB102 | -1440 | 79 | 47 | 119 | 107 | 39 | 126 | 176 | 109 | 229 | 173 |
| GIB102 | -1430 | 254 | 254 | 300 | 229 | 225 | 216 | 227 | 199 | 192 | 144 |
| GIB102 | -1420 | 203 | 129 | 207 | 220 | 124 | 121 | 100 | 82 | 109 | 102 |
| GIB102 | -1410 | 104 | 141 | 76 | 151 | 96 | 93 | 102 | 67 | 37 | 77 |
| GIB102 | -1400 | 66 | 57 | 112 | 68 | 57 | 70 | 25 | 143 | 129 | 91 |
| GIB102 | -1390 | 82 | 19 | 28 | 56 | 39 | 56 | 13 | 82 | 56 | 23 |
| GIB102 | -1380 | 54 | 35 | 85 | 79 | 61 | 43 | 15 | 41 | 25 | 25 |
| GIB102 | -1370 | 56 | 53 | 50 | 43 | 40 | 19 | 26 | 38 | 13 | 21 |
| GIB102 | -1360 | 19 | 34 | 58 | 57 | 47 | 23 | 48 | 25 | 49 | 50 |
| GIB102 | -1350 | 7 | 53 | 49 | 43 | 67 | 17 | 57 | 55 | 59 | 43 |
| GIB102 | -1340 | 74 | 67 |  |  |  |  |  |  |  |  |

Table 8: AA radiocarbon determinations from New Zealand kauri 3608-3453 BP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lab number** | **Tree number** | **14C Age (BP)** | **+/-** | **Calendar year (BP)** |
| AA109473 | GIB-102 | 3425 | 22 | 3608 |
| AA109978 | GIB-102 | 3417 | 22 | 3607 |
| AA109472 | GIB-102 | 3379 | 21 | 3606 |
| AA109979 | GIB-102 | 3411 | 28 | 3605 |
| AA109471 | GIB-102 | 3425 | 21 | 3604 |
| AA109980 | GIB-102 | 3429 | 24 | 3603 |
| AA109470 | GIB-102 | 3344 | 25 | 3602 |
| AA109981 | GIB-102 | 3422 | 21 | 3601 |
| AA109469 | GIB-102 | 3410 | 23 | 3600 |
| AA109982 | GIB-102 | 3433 | 29 | 3599 |
| AA109468 | GIB-102 | 3405 | 28 | 3598 |
| AA109983 | GIB-102 | 3458 | 23 | 3597 |
| AA109467 | GIB-102 | 3404 | 24 | 3596 |
| AA109466 | GIB-102 | 3438 | 23 | 3594 |
| AA109465 | GIB-102 | 3409 | 25 | 3592 |
| AA109464 | GIB-102 | 3394 | 22 | 3590 |
| AA109108 | GIB-102 | 3359 | 20 | 3520 |
| AA109107 | GIB-102 | 3372 | 29 | 3519 |
| AA109106 | GIB-102 | 3348 | 20 | 3518 |
| AA109105 | GIB-102 | 3360 | 21 | 3517 |
| AA109104 | GIB-102 | 3369 | 21 | 3516 |
| AA109103 | GIB-102 | 3354 | 21 | 3515 |
| AA109102 | GIB-102 | 3351 | 20 | 3514 |
| AA109101 | GIB-102 | 3360 | 20 | 3513 |
| AA108879 | GIB-102 | 3391 | 20 | 3512 |
| AA108878 | GIB-102 | 3360 | 21 | 3511 |
| AA108877 | GIB-102 | 3366 | 24 | 3510 |
| AA108876 | GIB-102 | 3346 | 20 | 3509 |
| AA108875 | GIB-102 | 3388 | 21 | 3508 |
| AA108721 | GIB-102 | 3315 | 27 | 3506 |
| AA108720 | GIB-102 | 3391 | 27 | 3505 |
| AA108719 | GIB-102 | 3406 | 27 | 3504 |
| AA108718 | GIB-102 | 3397 | 27 | 3503 |
| AA108717 | GIB-102 | 3353 | 30 | 3502 |
| AA108716 | GIB-102 | 3395 | 30 | 3501 |
| AA108715 | GIB-102 | 3388 | 28 | 3500 |
| AA108714 | GIB-102 | 3379 | 27 | 3499 |
| AA108713 | GIB-102 | 3371 | 27 | 3498 |
| AA108712 | GIB-102 | 3347 | 29 | 3497 |
| AA108758 | GIB-102 | 3358 | 40 | 3496 |
| AA108757 | GIB-102 | 3373 | 28 | 3495 |
| AA109100 | GIB-102 | 3337 | 20 | 3494 |
| AA109099 | GIB-102 | 3365 | 20 | 3493 |
| AA109098 | GIB-102 | 3345 | 20 | 3492 |
| AA110357 | GIB-102 | 3372 | 22 | 3491 |
| AA110356 | GIB-102 | 3364 | 23 | 3490 |
| AA110355 | GIB-102 | 3323 | 23 | 3489 |
| AA110358 | GIB-102 | 3345 | 22 | 3488 |
| AA110359 | GIB-102 | 3352 | 27 | 3487 |
| AA110360 | GIB-102 | 3339 | 22 | 3486 |
| AA110361 | GIB-102 | 3345 | 22 | 3485 |
| AA110362 | GIB-102 | 3316 | 31 | 3484 |
| AA109749 | GIB-102 | 3298 | 32 | 3483 |
| AA109748 | GIB-102 | 3338 | 23 | 3482 |
| AA109669 | GIB-102 | 3252 | 30 | 3481 |
| AA109668 | GIB-102 | 3315 | 22 | 3480 |
| AA109667 | GIB-102 | 3287 | 23 | 3479 |
| AA109666 | GIB-102 | 3286 | 22 | 3478 |
| AA109665 | GIB-102 | 3262 | 22 | 3477 |
| AA109664 | GIB-102 | 3300 | 22 | 3476 |
| AA109663 | GIB-102 | 3264 | 22 | 3475 |
| AA109662 | GIB-102 | 3313 | 24 | 3474 |
| AA109661 | GIB-102 | 3351 | 22 | 3473 |
| AA109660 | GIB-102 | 3298 | 22 | 3472 |
| AA109659 | GIB-102 | 3317 | 22 | 3471 |
| AA109658 | GIB-102 | 3317 | 31 | 3470 |
| AA109657 | GIB-102 | 3291 | 22 | 3469 |
| AA109656 | GIB-102 | 3313 | 22 | 3468 |
| AA109655 | GIB-102 | 3312 | 23 | 3467 |
| AA109654 | GIB-102 | 3327 | 22 | 3466 |
| AA109747 | GIB-102 | 3312 | 23 | 3465 |
| AA109746 | GIB-102 | 3284 | 23 | 3464 |
| AA110531 | GIB-102 | 3353 | 23 | 3463 |
| AA110533 | GIB-102 | 3308 | 22 | 3461 |
| AA110534 | GIB-102 | 3301 | 23 | 3460 |
| AA110535 | GIB-102 | 3307 | 22 | 3459 |
| AA110536 | GIB-102 | 3338 | 25 | 3458 |
| AA110538 | GIB-102 | 3287 | 23 | 3456 |
| AA110539 | GIB-102 | 3334 | 23 | 3455 |
| AA110540 | GIB-102 | 3286 | 23 | 3454 |
| AA110541 | GIB-102 | 3271 | 25 | 3453 |