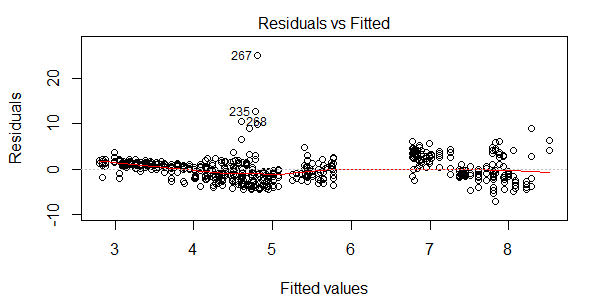
Supplementary material

Table S1. Three-way ANOVA test on leaf-level WUE and iWUE

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sources** | | **numDF** | **Sum Square** | **Mean Square** | **F-value** | **p-value** |
| **Leaf-level WUE** | |  |  |  |  |  |
|  | *Model formula: aov( leaf-level WUE~ Thinning\*Aspect\*Date)* | | | | | |
| Thinning | | 1 | 4 | 3.9 | 0.534 | 0.465 |
| Aspect | | 1 | 2 | 2.3 | 0.317 | 0.573 |
| Date | | 1 | 1413 | 1412.9 | 193.612 | <0.001 |
| Thinning × Aspect | | 1 | 0 | 0.4 | 0.059 | 0.808 |
| Thinning × Date | | 1 | 0 | 0.4 | 0.048 | 0.826 |
| Aspect × Date | | 1 | 8 | 8.5 | 1.160 | 0.282 |
| Thinning × Aspect × Date | | 1 | 1 | 0.6 | 0.077 | 0.781 |
| Residuals | | 538 | 3926 | 7.3 |  |  |
|  | |  |  |  |  |  |
| **Leaf-level WUEi** | |  |  |  |  |  |
|  | *Model formula: aov( leaf-level WUEi~ Thinning\*Aspect\*Date)* | | | | | |
| Thinning | | 1 | 89634 | 89634 | 43.709 | <0.001 |
| Aspect | | 1 | 10 | 10 | 0.005 | 0.946 |
| Date | | 1 | 271598 | 271598 | 132.443 | <0.001 |
| Thinning × Aspect | | 1 | 468 | 468 | 0.228 | 0.633 |
| Thinning × Date | | 1 | 4540 | 4540 | 2.214 | 0.137 |
| Aspect × Date | | 1 | 1221 | 1221 | 0.595 | 0.441 |
| Thinning × Aspect × Date | | 1 | 5 | 5 | 0.003 | 0.959 |
| Residuals | | 538 | 1103266 | 2051 |  |  |



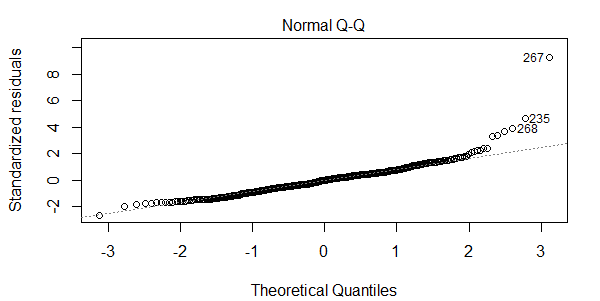
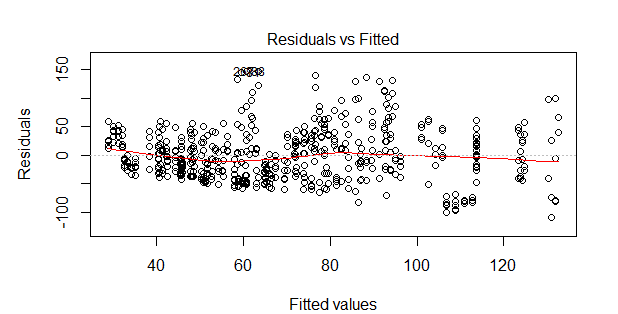


Figure S1 Residual check for the three-way ANOVA model for leaf-level WUE.



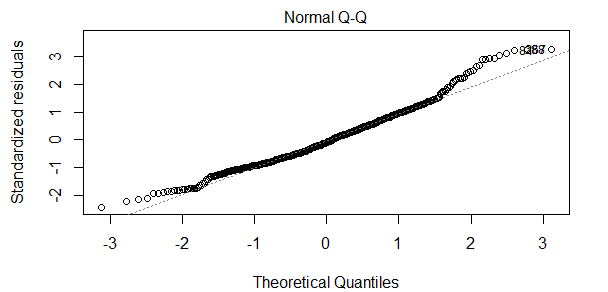


Figure S2 Residual check for the three-way ANOVA model for leaf-level WUEi.

Table S2. ANCOVA test on tree-level WUE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model structure: Intercept + Initial DBH + Thinning + Year + Thinning \* Year | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 14.667a | 6 | 2.445 | 2.962 | .028 |
| Intercept | 12.089 | 1 | 12.089 | 14.651 | .001 |
| Initial DBH | 8.484 | 1 | 8.484 | 10.282 | .004 |
| Thinning | 6.578 | 2 | 3.289 | 3.986 | .033 |
| Year | .608 | 1 | .608 | .736 | .400 |
| Thinning \* Year | .294 | 2 | .147 | .178 | .838 |
| Error | 18.154 | 22 | .825 |  |  |
| Total | 42.966 | 29 |  |  |  |
| Corrected Total | 32.821 | 28 |  |  |  |
| Note:  a. R Squared = .447 (Adjusted R Squared = .296)  Levene's Test of Equality of Error Variances p =0.532. | | | | | |

Table S3. ANCOVA test on initial tree DBH

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model structure: Intercept + Treatment + Year + Treatment \* Year | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 344.282a | 5 | 68.856 | .408 | .838 |
| Intercept | 98275.994 | 1 | 98275.994 | 582.642 | .000 |
| Thinning | 224.560 | 2 | 112.280 | .666 | .524 |
| Year | 107.138 | 1 | 107.138 | .635 | .434 |
| Thinning \* Year | 31.272 | 2 | 15.636 | .093 | .912 |
| Error | 3879.482 | 23 | 168.673 |  |  |
| Total | 102542.208 | 29 |  |  |  |
| Corrected Total | 4223.764 | 28 |  |  |  |
| Note:  a. R Squared = .082 (Adjusted R Squared = -.118)  Levene's Test of Equality of Error Variances p =0.987. | | | | | |

Fig. S3. Leaf-level WUE (top) WUEi (bottom) versus VPD for C, T1 and T2 with fitted logarithmatic equations.

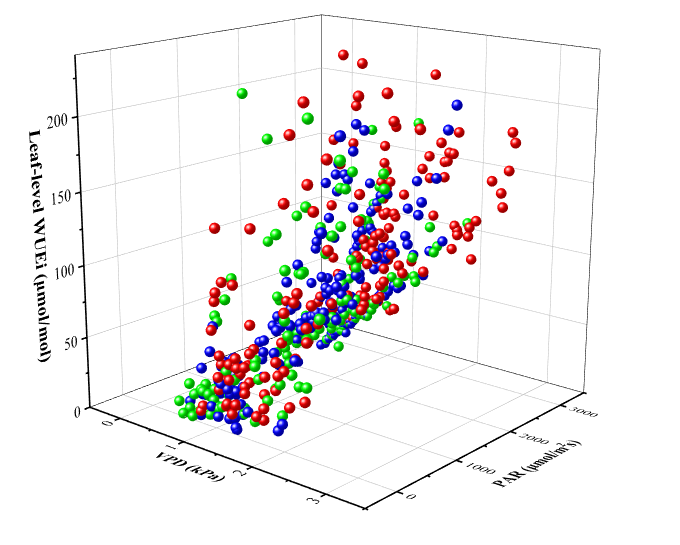


Figure S4. 3D scatter plot of leaf-level WUEi against VPD and PAR for C (in red), T1 (in green) and T2 (in blue).

Table S4. Two-way ANOVA test on log-transformed stand-level WUE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model structure: Intercept + Treatment + Year + Treatment \* Year | | | | | |
| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
| Corrected Model | 0.862a | 5 | 0.172 | 11.865 | 0.002 |
| Intercept | 0.028 | 1 | 0.028 | 1.913 | 0.204 |
| Thinning | 0.046 | 2 | 0.023 | 1.567 | 0.267 |
| Year | 0.623 | 1 | 0.623 | 42.860 | 0.000 |
| Thinning \* Year | 0.077 | 2 | 0.039 | 2.662 | 0.130 |
| Error | 0.116 | 8 | 0.015 |  |  |
| Total | 1.161 | 14 |  |  |  |
| Corrected Total | 0.978 | 13 |  |  |  |
| Note:  a. R Squared = .881 (Adjusted R Squared = 0.807)  Levene's Test of Equality of Error Variances p =0.103. | | | | | |

A screenshot of a cell phone

Description automatically generated

Figure S5. Temperature, VPD and PAR in C, T1 and T2 during leaf measurement periods.

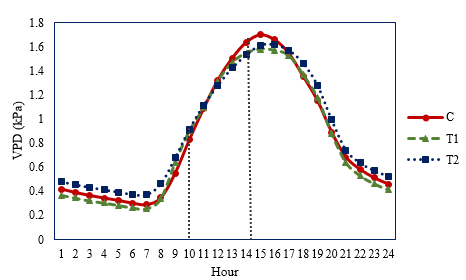


Figure S6. Daily VPD variations in C, T1 and T2. Leaf-level measurements took place between 10 am to 14 pm.