

Supplementary Materials

Wood anatomical traits respond to climate but more individualistically as compared to radial growth: analyze trees, not means

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Table S1. Multilevel model results for the three analyzed *Pinus halepensis* trees. Estimates of the selected linear mixed-effects models fitted to log-transformed tree-ring width (TRW), mean conduit area (MCA), and cell-wall thickness (CWT) as a function of spring P–PET_{MAM} (for TRW and MCA) or summer P–PET_{JJA} (for CWT). The random effect rows show the statistics of the models including the R²_m and R²_c, which correspond to the marginal and conditional R² values accounting for the variance explained by fixed and fixed plus random effects, respectively. Abbreviations: ICC, intra-class correlation coefficient; σ^2 , within-group variance; τ_{00} , between-group-variance. Significant effects ($p < 0.05$) are in bold.

Predictors	TRW			MCA			CWT		
	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p
(Intercept)	0.07	-0.29 – 0.44	0.699	5.53	5.41 – 5.65	<0.001	1.63	1.60 – 1.66	<0.001
P-PET	0.21	-0.06 – 0.47	0.122	-0.03	-0.12 – 0.06	0.471	-0.01	-0.02 – 0.01	0.347
Random Effects									
σ^2	0.48			0.06			0.00		
τ_{00}	0.59 _{age}			0.06 _{age}			0.00 _{age}		
	0.09 _{tree}			0.01 _{tree}			0.00 _{tree}		
ICC	0.58			0.54			0.21		
N	5 _{tree}			5 _{tree}			5 _{tree}		
	43 _{age}			43 _{age}			43 _{age}		
Observations	173			173			173		
R _m ² / R _c ²	0.030 / 0.596			0.006 / 0.548			0.006 / 0.212		

Table S2. Multilevel model results for the three analyzed *Pinus sylvestris* trees. Estimates of the selected linear mixed-effects models fitted to log-transformed tree-ring width (TRW), mean conduit area (MCA), and cell-wall thickness (CWT) as a function of spring P–PET_{MAM} (for TRW and MCA) or summer P–PET_{JJA} (for CWT). The random effect rows show the statistics of the models including the R²_m and R²_c, which correspond to the marginal and conditional R² values accounting for the variance explained by fixed and fixed plus random effects, respectively. Abbreviations: ICC, intra-class correlation coefficient; σ^2 , within-group variance; τ_{00} , between-group-variance. Significant effects ($p < 0.05$) are in bold.

Predictors	TRW			MCA			CWT		
	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p
(Intercept)	0.00	-0.30 – 0.31	0.974	6.03	5.82 – 6.24	<0.001	1.64	1.61 – 1.67	<0.001
P-PET	0.22	0.10 – 0.33	<0.001	0.07	0.03 – 0.10	<0.001	0.02	0.01 – 0.03	<0.001
Random Effects									
σ^2	0.79			0.09			0.00		
τ_{00}	0.09 _{age}			0.00 _{age}			0.00 _{age}		
	0.10 _{tree}			0.06 _{tree}			0.00 _{tree}		
ICC	0.19						0.28		
N	5 _{tree}			5 _{tree}			5 _{tree}		
	148 _{age}			148 _{age}			148 _{age}		
Observations	264			264			263		
R _m ² / R _c ²	0.046 / 0.228			0.021 / 0.39			0.079 / 0.340		

Table S3. Multilevel model results for the three analyzed *Pinus lumholtzii* trees. Estimates of the selected linear mixed-effects models fitted to log-transformed tree-ring width (TRW), mean conduit area (MCA), and cell-wall thickness (CWT) as a function of spring P–PET_{MAM} (for TRW and MCA) or summer P–PET_{JJA} (for CWT). The random effect rows show the statistics of the models including the R²_m and R²_c, which correspond to the marginal and conditional R² values accounting for the variance explained by fixed and fixed plus random effects, respectively. Abbreviations: ICC, intra-class correlation coefficient; σ^2 , within-group variance; τ_{00} , between-group-variance. Significant effects ($p < 0.05$) are in bold.

Predictors	TRW			MCA			CWT		
	Estimates	CI	p	Estimates	CI	p	Estimates	CI	p
(Intercept)	-0.01	-0.53 – 0.51	0.970	6.07	5.93 – 6.21	<0.001	1.95	1.87 – 2.03	<0.001
P-PET	0.19	0.09 – 0.29	<0.001	0.01	-0.02 – 0.05	0.448	-0.00	-0.02 – 0.02	0.913
Random Effects									
σ^2	0.49			0.04			0.01		
τ_{00}	0.25 _{age}			0.00 _{age}			0.00 _{age}		
	0.26 _{tree}			0.02 _{tree}			0.01 _{tree}		
ICC	0.51			0.30			0.43		
N	4 _{tree}			4 _{tree}			4 _{tree}		
	71 _{age}			51 _{age}			51 _{age}		
Observations	220			155			155		
R _m ² / R _c ²	0.036 / 0.528			0.003 / 0.306			0.000 / 0.434		

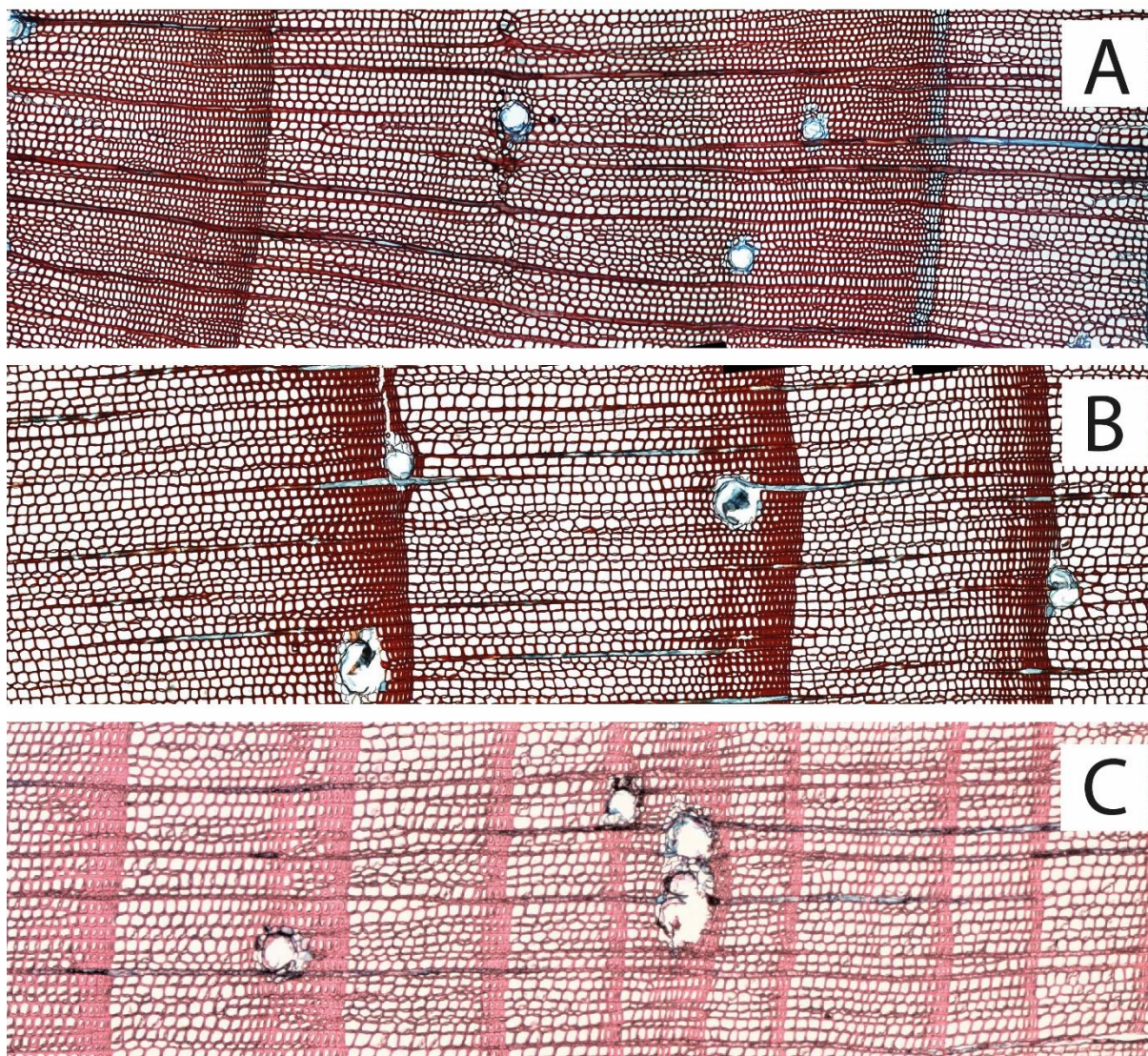


Figure S1. Wood cross-section of *Pinus halepensis* (A), *Pinus sylvestris* (B), and *Pinus lumholtzii* (C).

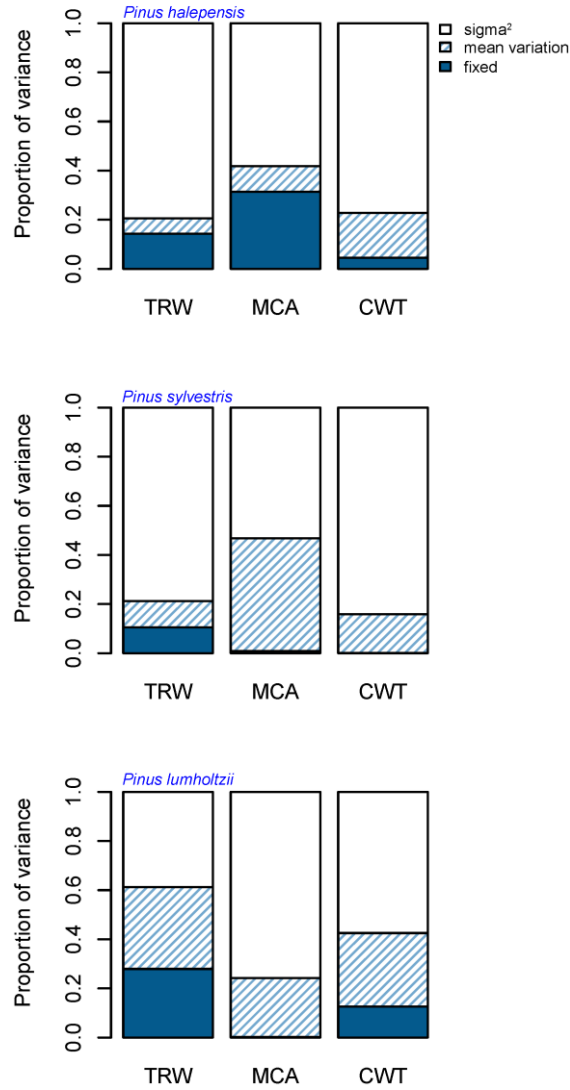


Figure S2. Sources of variation within tree species for model relationships between seasonal water balance, tree age (years) and raw tree-ring width and xylem anatomical traits. Relative variance decomposition is shown for: tree-ring width (MRW), mean conduit area (MCA), and cell-wall thickness (CWT). In the legend, σ^2 is the variance attributable to residuals; mean variation is the variance attributable to the random ID i.e., random intercept variation; and fixed is the explained variance by fixed variable, i.e., seasonal water balance (P-PET) and tree age.

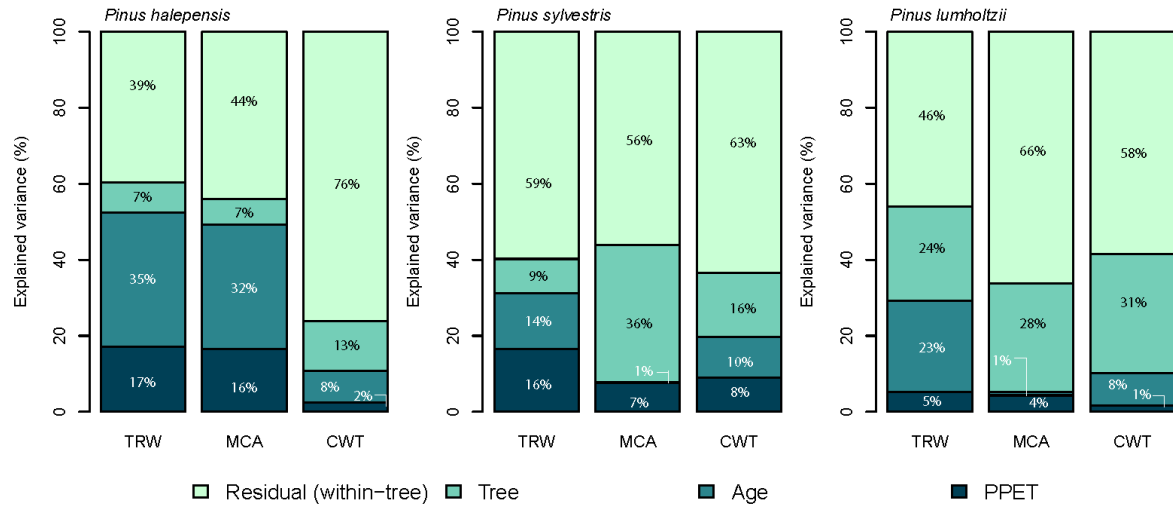


Figure S3. Variance in tree-ring width (TRW) and wood anatomical variables (MCA, mean conduit area; CWT, cell-wall thickness) explained by variation in spring, summer, autumn, and winter seasonal water balance (P-PET) between individual trees, and age for *P. halepensis*, *P. sylvestris*, and *P. lumholtzii*. Tree represents individual trees, and Age is the individual cambial age. Unexplained variance attributable to residuals is also reported.