

Forests supporting information

Article title: **Influence of Juvenile Growth on Xylem Safety and Efficiency in Three Temperate Tree Species**

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Supporting information

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Table S1: Summary of all major variables explored (means \pm SE). The number of investigated plants is given in parentheses. Species abbreviations are as follows: ACPS: *A. pseudoplatanus*; BEPE: *B. pendula*; SOAU: *S. aucuparia*; the treatment is indicated by C for control or S for stress. Small letters indicate significant differences between the control and stress treatment within a given species. For details on the abbreviations, please refer to Table 1.

Variables	Unit	ACPS_C	ACPS_S	BEPE_C	BEPE_S	SOAU_C	SOAU_S
Growth-related traits							
RCD	mm	17.31 \pm 0.38 ^a (16)	10.59 \pm 0.20 ^b (12)	20.75 \pm 0.42 ^a (18)	11.39 \pm 0.38 ^b (12)	19.50 \pm 0.54 ^a (14)	11.671 \pm 0.27 ^b (10)
Shoot length	cm	209.38 \pm 10.71 ^a (16)	103.42 \pm 4.80 ^b (12)	264.11 \pm 3.42 ^a (18)	139.11 \pm 5.41 ^b (12)	234.07 \pm 11.44 ^a (14)	156.90 \pm 4.13 ^b (10)
AGB	g	158.56 \pm 15.30 ^a (11)	30.58 \pm 2.02 ^b (12)	222.39 \pm 9.16 ^a (10)	39.58 \pm 3.61 ^b (11)	168.30 \pm 11.63 ^a (11)	58.00 \pm 4.54 ^b (10)
ABI	mg d ⁻¹	287.07 \pm 23.39 ^a (10)	60.72 \pm 3.99 ^b (12)	424.22 \pm 18.65 ^a (9)	79.28 \pm 7.25 ^b (11)	323.97 \pm 19.69 ^a (9)	116.95 \pm 9.81 ^b (9)
Branch-related traits							
A_{leaf}	cm ²	35.56 \pm 2.53 ^a (11)	30.87 \pm 1.85 ^a (12)	31.72 \pm 4.53 ^a (10)	9.15 \pm 0.73 ^b (11)	46.64 \pm 2.43 ^a (11)	44.38 \pm 6.45 ^a (10)
HV	10 ⁻⁴ m ² m ⁻²	2.32 \pm 0.23 ^a (16)	3.04 \pm 0.20 ^b (12)	1.42 \pm 0.09 ^a (17)	3.01 \pm 0.25 ^b (11)	3.91 \pm 0.32 ^a (14)	4.10 \pm 0.21 ^a (10)
SLA	cm ² g ⁻¹	163.77 \pm 11.09 ^a (11)	205.92 \pm 5.72 ^b (12)	234.31 \pm 17.71 ^a (10)	180.91 \pm 6.49 ^b (11)	162.64 \pm 5.75 ^a (11)	131.15 \pm 3.02 ^b (10)
Wood anatomical traits							
D	μm	33.93 \pm 1.01 ^a (16)	27.12 \pm 0.46 ^b (12)	32.35 \pm 0.43 ^a (17)	26.83 \pm 0.41 ^b (11)	26.07 \pm 0.86 ^a (14)	25.56 \pm 0.53 ^a (10)
D_{h}	μm	42.21 \pm 1.23 ^a (16)	34.01 \pm 0.68 ^b (12)	42.06 \pm 0.62 ^a (17)	33.74 \pm 0.73 ^b (11)	30.60 \pm 1.07 ^a (14)	29.00 \pm 0.55 ^a (10)
$D_{\text{h}}^{\text{std}}$	μm	41.50 \pm 1.36 ^a (16)	34.67 \pm 0.72 ^b (12)	40.18 \pm 0.63 ^a (17)	31.86 \pm 0.74 ^b (11)	30.21 \pm 1.18 ^a (14)	28.08 \pm 0.55 ^a (10)
VD	n mm ⁻²	105.21 \pm 5.84 ^a (16)	114.67 \pm 8.00 ^a (12)	196.86 \pm 6.97 ^a (17)	191.39 \pm 9.18 ^a (11)	323.30 \pm 19.84 ^a (14)	349.37 \pm 10.19 ^a (10)
$A_{\text{lumen}}/A_{\text{xylem}}$	%	10.64 \pm 0.85 ^a (16)	7.33 \pm 0.56 ^b (12)	18.38 \pm 0.69 ^a (17)	12.07 \pm 0.66 ^b (11)	18.15 \pm 1.11 ^a (14)	18.93 \pm 0.65 ^a (10)
Hydraulic traits							
P_{12}	MPa	-2.79 \pm 0.21 ^a (9)	-3.04 \pm 0.12 ^a (12)	-1.71 \pm 0.04 ^a (8)	-1.64 \pm 0.02 ^a (10)	-2.70 \pm 0.09 ^a (10)	-3.17 \pm 0.23 ^b (10)
P_{50}	MPa	-3.32 \pm 0.27 ^a (9)	-3.70 \pm 0.08 ^a (12)	-1.97 \pm 0.03 ^a (8)	-1.86 \pm 0.02 ^b (10)	-3.87 \pm 0.09 ^a (10)	-4.24 \pm 0.14 ^b (10)
P_{88}	MPa	-3.85 \pm 0.34 ^a (9)	-4.37 \pm 0.08 ^a (12)	-2.22 \pm 0.03 ^a (8)	-2.08 \pm 0.03 ^b (10)	-5.04 \pm 0.12 ^a (10)	-5.31 \pm 0.10 ^a (10)
K_{S}	kg m ⁻¹ MPa ⁻¹ s ⁻¹	0.71 \pm 0.09 ^a (10)	0.41 \pm 0.05 ^b (10)	1.83 \pm 0.18 ^a (11)	0.97 \pm 0.05 ^b (11)	1.22 \pm 0.12 ^a (11)	1.13 \pm 0.10 ^a (10)
K_{L}	10 ⁻⁴ kg m ⁻¹ MPa ⁻¹ s ⁻¹	1.76 \pm 0.24 ^a (10)	1.31 \pm 0.17 ^a (10)	2.87 \pm 0.38 ^a (11)	2.88 \pm 0.22 ^a (10)	5.21 \pm 0.67 ^a (11)	4.63 \pm 0.50 ^a (10)
K_{pit}	kg m ⁻¹ MPa ⁻¹ s ⁻¹	0.85 \pm 0.11 ^a (10)	0.50 \pm 0.07 ^b (10)	2.41 \pm 0.28 ^a (11)	1.32 \pm 0.09 ^b (10)	1.66 \pm 0.20 ^a (11)	1.53 \pm 0.16 ^a (10)
K_{p}	kg m ⁻¹ MPa ⁻¹ s ⁻¹	5.39 \pm 0.68 ^a (16)	2.25 \pm 0.21 ^b (12)	8.50 \pm 0.47 ^a (17)	3.60 \pm 0.29 ^b (11)	4.83 \pm 0.47 ^a (14)	4.56 \pm 0.30 ^a (10)

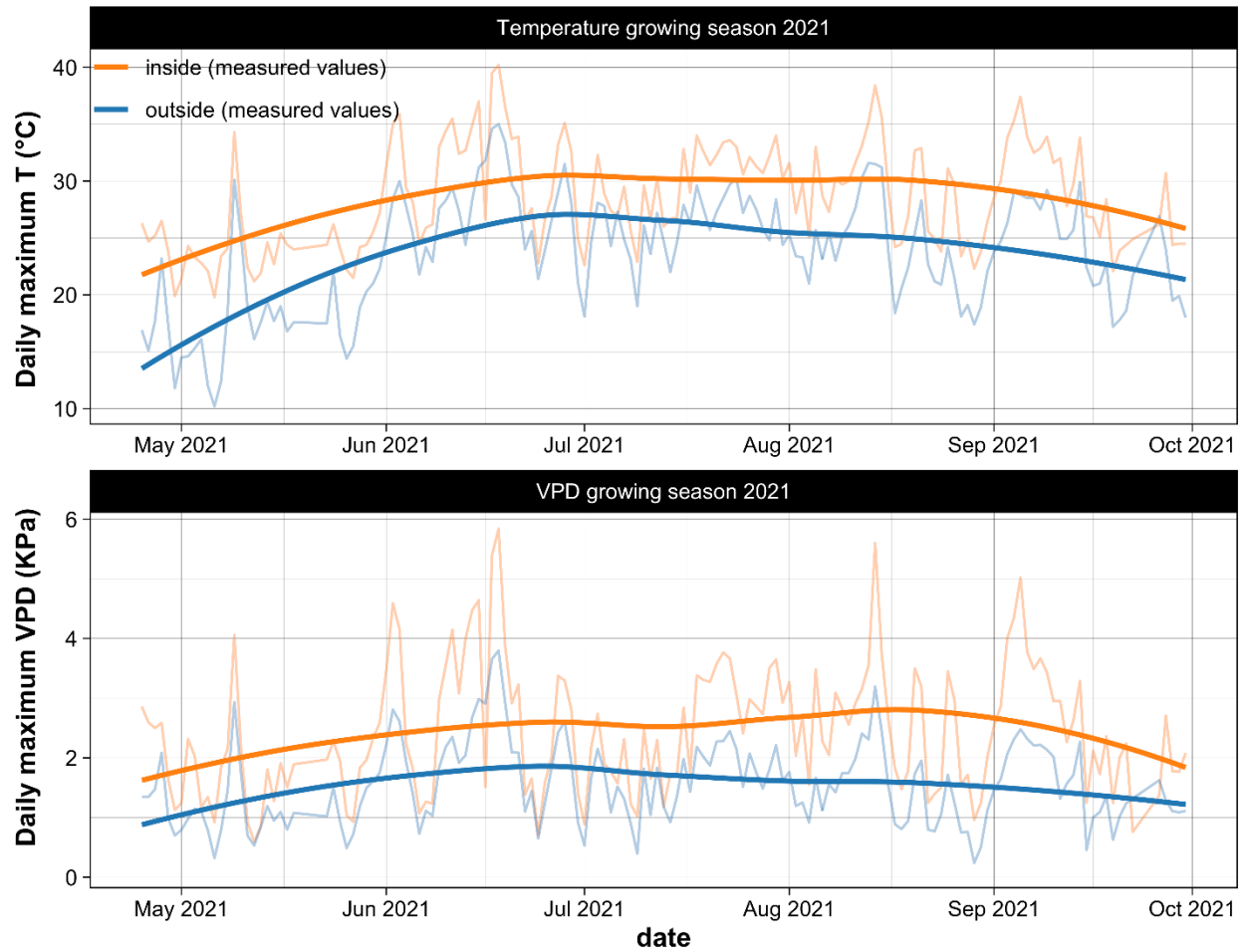


Figure S1. Measured daily maximum temperature (top) and daily maximum vapour pressure deficit (bottom) for the growing season from May to September in 2022. The blue line refers to open-field (outside) measurements, and the orange line to measurements inside the growing chamber of the greenhouse.

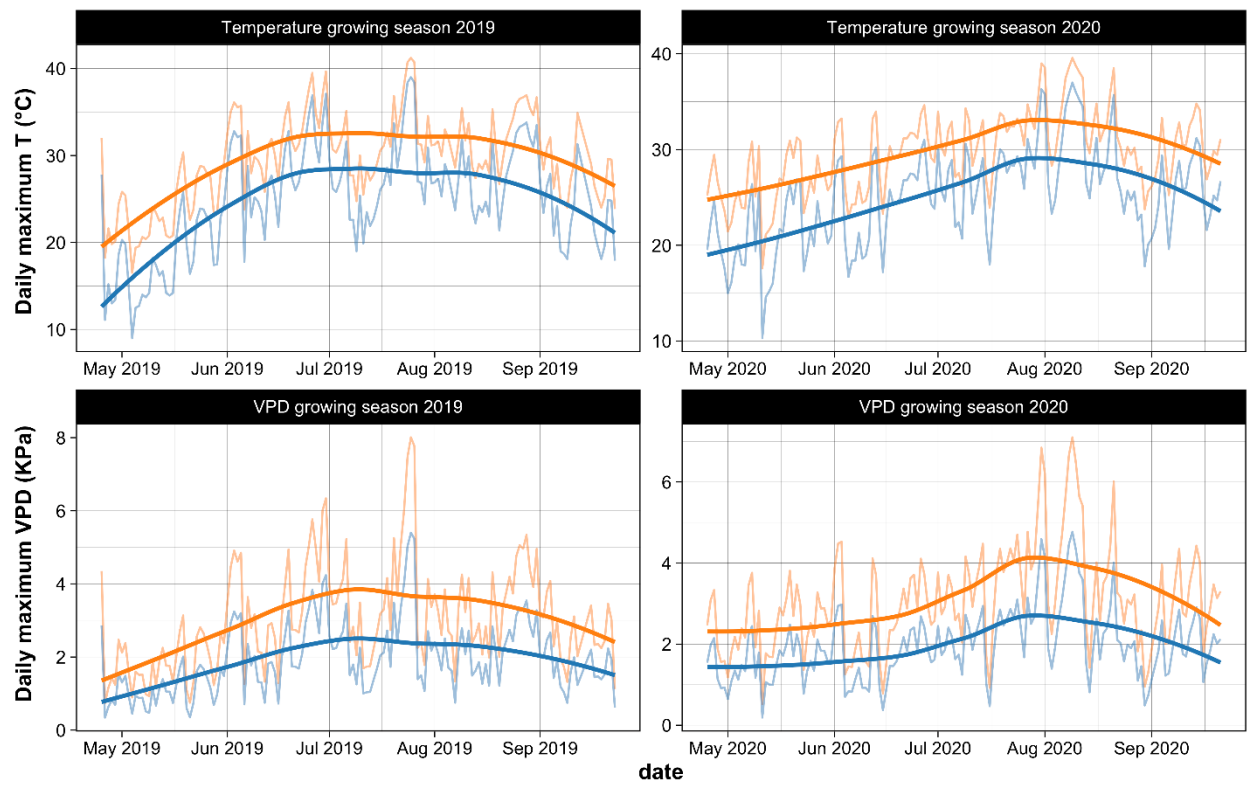


Figure S2. Daily maximum temperature (top) and daily maximum vapour pressure deficit (bottom) for the growing season from May to September in 2019 and 2020. The blue line refers to open-field (outside) measurements, and the orange line to measurements inside the growing chamber of the greenhouse. Please note that only the outside values have been empirically measured, inside values were modelled according to available data from 2022 (Figure S1).

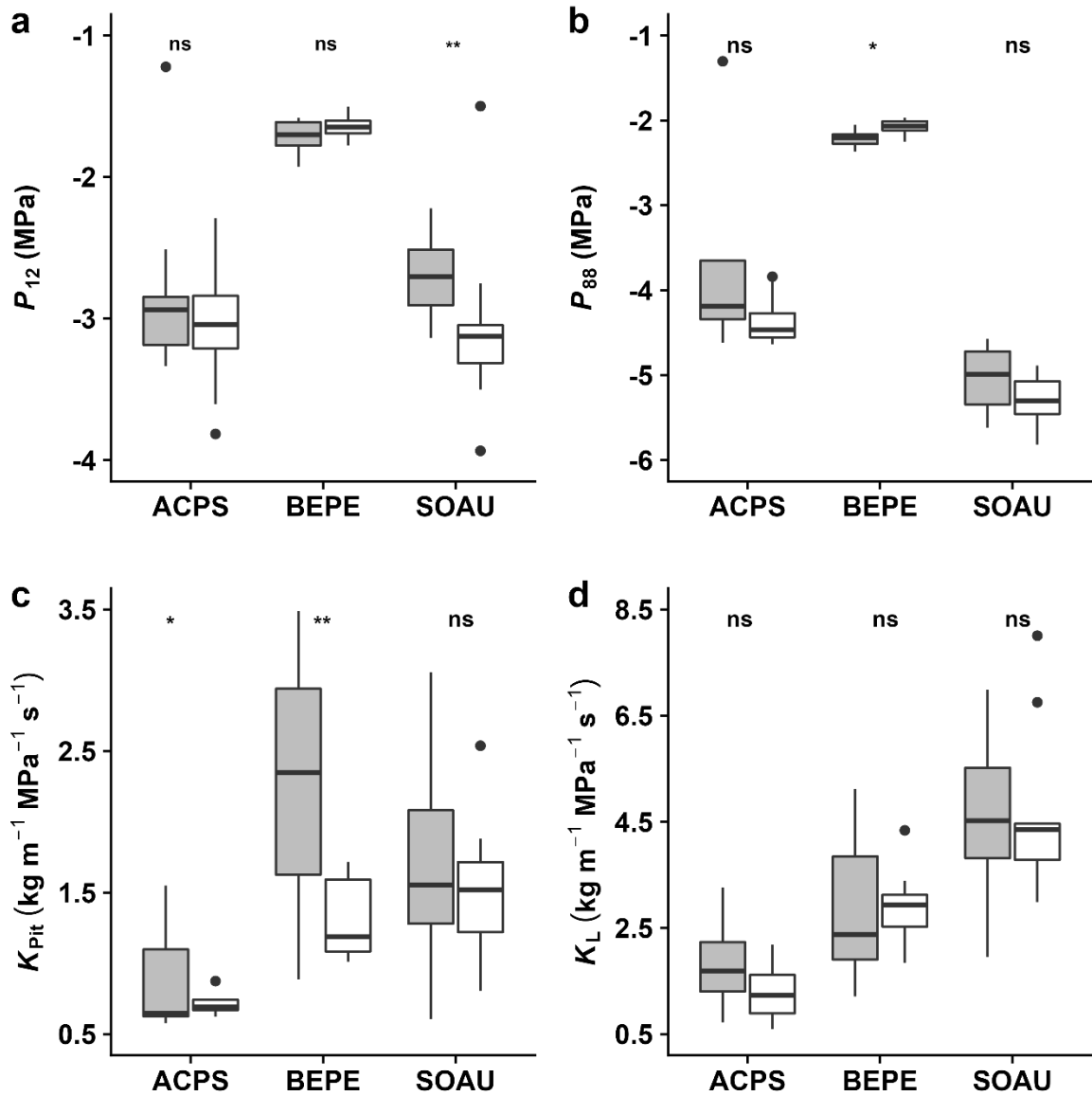


Figure S3. Boxplot depicting the plasticity of additional safety - efficiency traits for three tree species. Given are (a) water potential at 12% loss of hydraulic conductivity (P_{12}), (b) water potential at 88% loss of hydraulic conductivity (P_{88}), (c) pit conductivity (K_{pit}), (d) leaf specific conductivity (K_L) for the control (grey) and stress (white) treatment. Asterisks indicate the level of significance (*, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$; ns, for non-significant). For species abbreviations, see Figure 1.

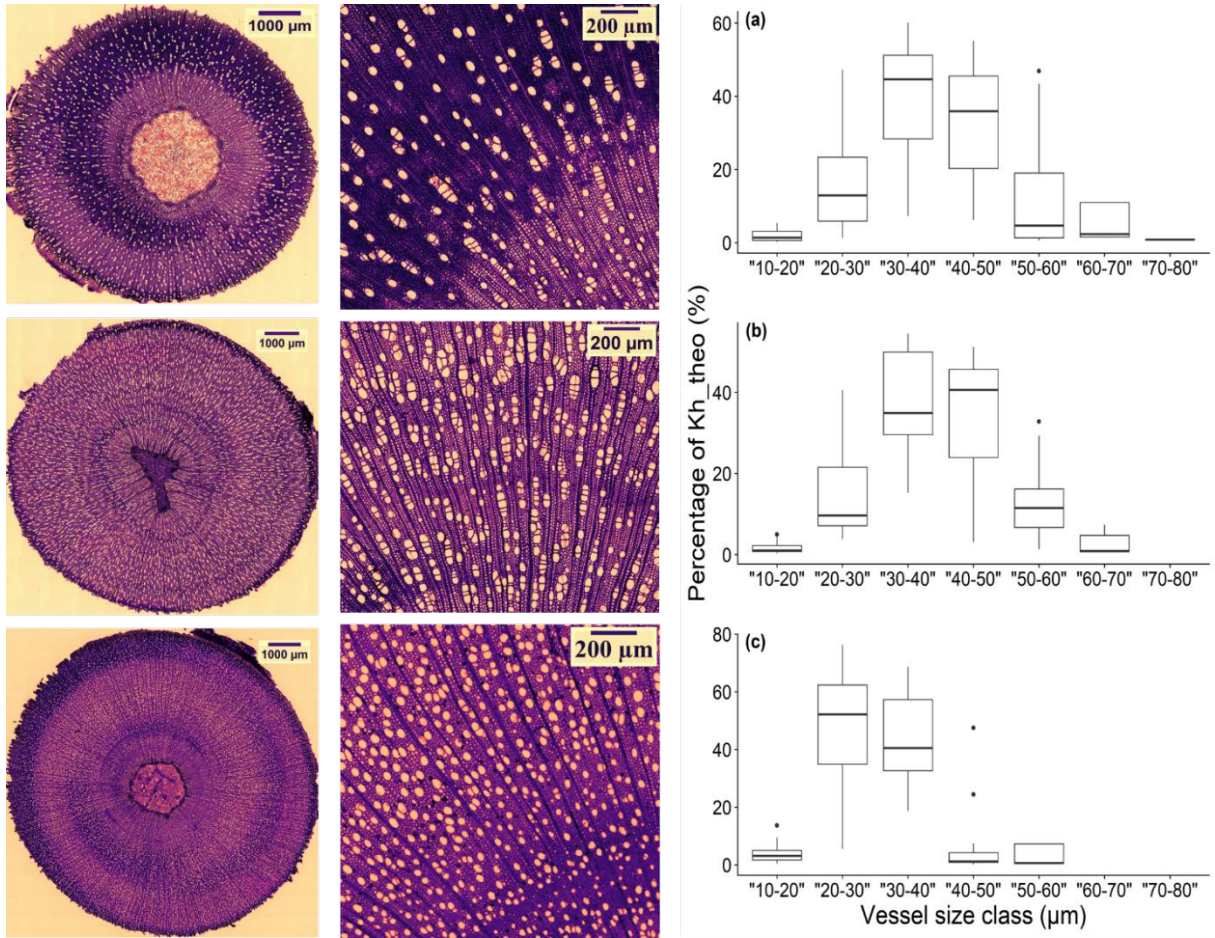


Figure S4. In the left column, exemplary cross-sectional images of the stem wood of (top) *A. pseudoplatanus*, (middle), *B. pendula* and (bottom) *S. aucuparia* are given. In the central column, sections of sapwood at 5-fold magnification are shown. The right column, i.e., boxplot depicting the contribution of seven vessel size classes (10-80 μm) to K_h^{theo} for the three tree species. Given are (a) *A. pseudoplatanus*, (b) *B. pendula*, and (c) *S. aucuparia*. Scales are indicated in each picture.

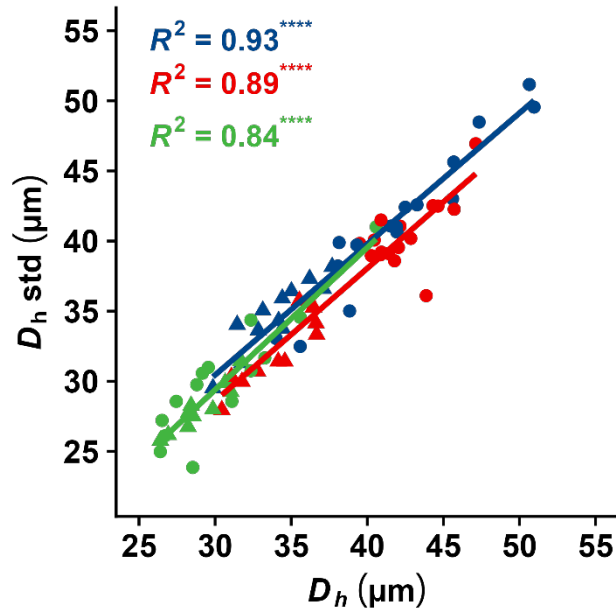


Figure S5. Standardized vessel diameter (D_h^{std}) in relation to hydraulically-weighted vessel diameter (D_h). The results from the linear regression analyses are given. Different colours and symbols represent different species and treatments (blue: *A. pseudoplatanus*; red: *B. pendula*; green: *S. aucuparia*; filled circles: control treatment; triangles: stress treatment). Indicated for each species are the coefficients of determination, i.e., R-squared, for the investigated relationships. Asterisks indicate the level of significance (*, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$; ns, for non-significant).

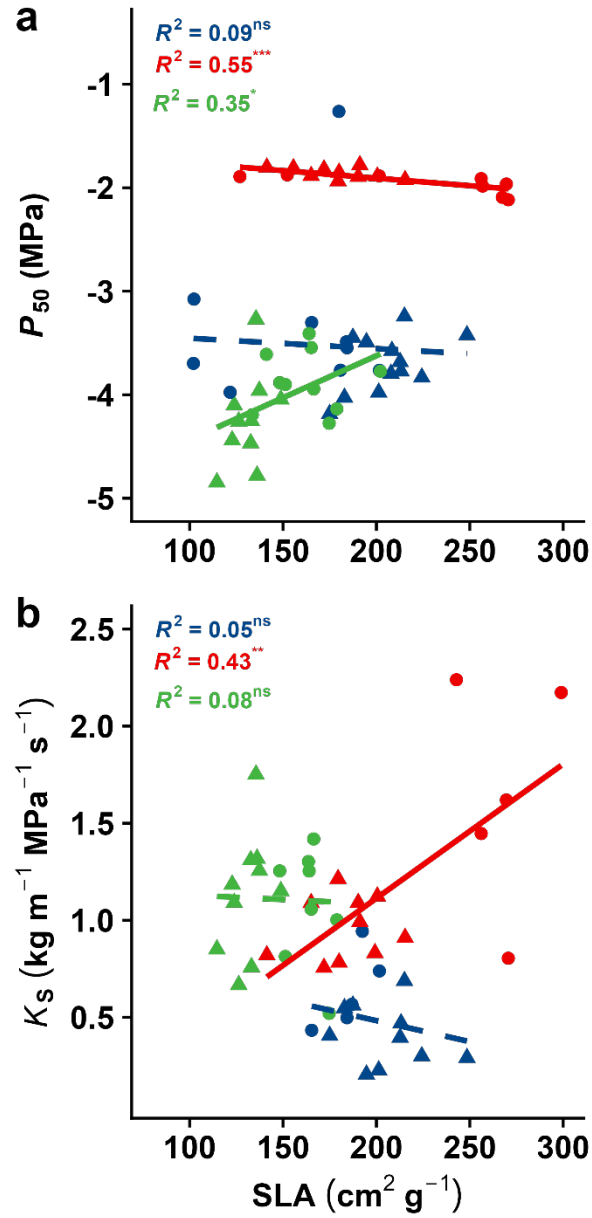


Figure S6. Water potential at 50% loss of hydraulic conductivity (P_{50}) in relation to (a) specific leaf area (SLA) and (b) specific conductivity (K_s) in relation to SLA. The results from the linear regression analyses are given. Different colours and symbols represent different species and treatments (blue: *A. pseudoplatanus*; red: *B. pendula*; green: *S. aucuparia*; filled circles: control treatment; triangles: stress treatment). Indicated for each species are the coefficients of determination, i.e., R-squared, for the investigated relationships. Full lines indicate significant effects of variable x on variable y; Dashed lines indicate a non-significant relationship. Asterisks indicate the level of significance (*, $P < 0.05$; **, $P < 0.01$; ***, $P < 0.001$; ns, for non-significant).