

Development of the biomechanical system of the flax stem: mutual game of primary and secondary growth

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Supplementary material

Table S1. Changes in total stem area during flax development. Means \pm SD are presented. Different letters next to the means correspond to a significant difference according to t-test or one-way ANOVA followed by Tukey test at $\alpha = 0.05$. Lowercase and uppercase letters indicate differences respectively within a column (between levels within one stage) and within a row (between the stages at one level). DAS - Days after sowing.

	Total stem area, mm ²			
	Herringbone 14 DAS	Fast growth 1 32 DAS	Fast growth 2 37 DAS	Flowering 47 DAS
Level 1	0.85 \pm 0.21a A	2.00 \pm 0.24ab B	2.44 \pm 0.46bc B	3.33 \pm 0.40d C
Level 2	0.92 \pm 0.20a A	2.42 \pm 0.31bc B	2.59 \pm 0.53c B	3.43 \pm 0.43d C
Level 3		2.62 \pm 0.43c AB	2.45 \pm 0.46bc A	3.22 \pm 0.35d B
Level 4		2.41 \pm 0.39bc AB	2.11 \pm 0.39bc A	2.83 \pm 0.25cd B
Level 5		1.70 \pm 0.20a A	1.71 \pm 0.37ab A	2.43 \pm 0.28bc B
Level 6			1.24 \pm 0.25a A	2.00 \pm 0.28ab B
Level 7			0.97 \pm 0.14a A	1.60 \pm 0.29a B

Table S2. Changes in xylem area during flax development. Means \pm SD are presented. Different letters next to the means correspond to a significant difference according to t-test or one-way ANOVA followed by Tukey test at $\alpha = 0.05$. Lowercase and uppercase letters indicate differences respectively within a column (between levels within one stage) and within a row (between the stages at one level). DAS - Days after sowing.

	Xylem area, mm ²			
	Herringbone 14 DAS	Fast growth 1 32 DAS	Fast growth 2 37 DAS	Flowering 47 DAS
Level 1	0.19 \pm 0.04a A	1.11 \pm 0.15c B	1.14 \pm 0.30d B	1.96 \pm 0.32e C
Level 2	0.20 \pm 0.02a A	0.77 \pm 0.17b B	0.92 \pm 0.14cd B	1.58 \pm 0.18d C
Level 3		0.73 \pm 0.21b A	0.69 \pm 0.16bc A	1.26 \pm 0.17cd B
Level 4		0.51 \pm 0.06ab A	0.52 \pm 0.15ab A	0.98 \pm 0.13bc B
Level 5		0.40 \pm 0.02a A	0.41 \pm 0.14ab A	0.86 \pm 0.11ab B
Level 6			0.31 \pm 0.16a A	0.67 \pm 0.10ab B
Level 7			0.28 \pm 0.05a A	0.51 \pm 0.09a B

Table S3. Changes in phloem area during flax development. Means \pm SD are presented. Different letters next to the means correspond to a significant difference according to t-test or one-way ANOVA followed by Tukey test at $\alpha = 0.05$. Lowercase and uppercase letters indicate differences respectively within a column (between levels within one stage) and within a row (between the stages at one level). DAS - Days after sowing.

	Phloem area, mm ²			
	Herringbone 14 DAS	Fast growth 1 32 DAS	Fast growth 2 37 DAS	Flowering 47 DAS
Level 1	0.42±0.12a A	0.69±0.13a B	0.65±0.15b B	0.80±0.09b B
Level 2	0.38±0.07a A	0.66±0.09a B	0.67±0.08b B	0.76±0.16b B
Level 3		0.77±0.15a A	0.70±0.14b A	0.76±0.12b A
Level 4		0.69±0.17a A	0.68±0.10b A	0.75±0.08ab A
Level 5		0.54±0.08a A	0.56±0.13ab A	0.63±0.12ab A
Level 6			0.41±0.05a A	0.62±0.06ab B
Level 7			0.39±0.04a A	0.55±0.07a B

Table S4. Changes in tertiary cell wall area during flax development. Means ± SD are presented. Different letters next to the means correspond to a significant difference according to t-test or one-way ANOVA followed by Tukey test at $\alpha = 0.05$. Lowercase and uppercase letters indicate differences respectively within a column (between levels within one stage) and within a row (between the stages at one level). DAS - Days after sowing.

	Tertiary cell wall area, mm ²			
	Herringbone 14 DAS	Fast growth 1 32 DAS	Fast growth 2 37 DAS	Flowering 47 DAS
Level 1	0.03±0.02b A	0.10±0.02c B	0.13±0.05c B	0.14±0.02ab B
Level 2	0.00±0.00a A	0.09±0.01c B	0.11±0.01c B	0.14±0.02ab C
Level 3		0.11±0.02c A	0.11±0.02c A	0.15±0.02b B
Level 4		0.04±0.03b A	0.10±0.03c B	0.13±0.02ab C
Level 5		0.00±0.00a A	0.09±0.02bc B	0.11±0.02a C
Level 6			0.04±0.01ab A	0.11±0.02a B
Level 7			0.00±0.00a A	0.10±0.02a B

Table S5. Changes in pith area during flax development. Means ± SD are presented. Different letters next to the means correspond to a significant difference according to t-test or one-way ANOVA followed by Tukey test at $\alpha = 0.05$. Lowercase and uppercase letters indicate differences respectively within a column (between levels within one stage) and within a row (between the stages at one level). DAS - Days after sowing.

	Pith area, mm ²			
	Herringbone 14 DAS	Fast growth 1 32 DAS	Fast growth 2 37 DAS	Flowering 47 DAS
Level 1	0.23±0.07a A	0.19±0.04a A	0.57±0.16b B	0.48±0.07ab B
Level 2	0.31±0.16a A	0.71±0.22b B	0.61±0.22b B	0.65±0.13b B
Level 3		0.73±0.18b A	0.61±0.12b A	0.66±0.10b A
Level 4		0.85±0.24b A	0.61±0.10b A	0.60±0.08b A
Level 5		0.69±0.13b A	0.44±0.09ab A	0.52±0.14ab A
Level 6			0.37±0.12ab A	0.47±0.12ab A
Level 7			0.30±0.07a A	0.38±0.09a A

Table S6. Changes in cavity area during flax development. Means \pm SD are presented. Different letters next to the means correspond to a significant difference according to t-test or one-way ANOVA followed by Tukey test at $\alpha = 0.05$. Lowercase and uppercase letters indicate differences respectively within a column (between levels within one stage) and within a row (between the stages at one level). DAS - Days after sowing.

	Cavity area, mm ²			
	Herringbone 14 DAS	Fast growth 1 32 DAS	Fast growth 2 37 DAS	Flowering 47 DAS
Level 1	0.01 \pm 0.01a A	0.01 \pm 0.01a A	0.07 \pm 0.05a AB	0.09 \pm 0.04a B
Level 2	0.03 \pm 0.03a A	0.28 \pm 0.05b B	0.40 \pm 0.18c B	0.44 \pm 0.05b B
Level 3		0.40 \pm 0.11c A	0.44 \pm 0.12c A	0.55 \pm 0.06b A
Level 4		0.35 \pm 0.13b A	0.30 \pm 0.10bc A	0.50 \pm 0.07b A
Level 5		0.06 \pm 0.04a A	0.30 \pm 0.09bc B	0.42 \pm 0.09b B
Level 6			0.15 \pm 0.14ab A	0.25 \pm 0.12b B
Level 7			0.00 \pm 0.00a A	0.15 \pm 0.09a B