

Supplementary Material for Manuscript I:

Wetter winters increase tree growth and amplify temperature effects on fine root growth in north-eastern European beech forests

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Fig. A1 Experimental setup (RnoS) at the coldest site KA, during a snow event. The rain collection roof is positioned at the back right, and the snow-out shelter is at the front left.

Table A.1 List of R-packages used for statistical analyses.

Package	Reference
AICcmodavg	Mazerolle MJ (2023) AICcmodavg: Model selection and multimodel inference based on (Q)AIC(c). R package version 2.3.3. https://cran.r-project.org/package=AICcmodavg .
ggplot2	Wickham H (2016) ggplot2: Elegant Graphics for Data Analysis. Springer New York.
lmerTest	Kuznetsova A, Brockhoff PB, Christensen RHB (2017) lmerTest Package: Tests in Linear Mixed Effects Models. <i>Journal of Statistical Software</i> 82.
MuMIn	Bartoń K (2024) MuMIn: Multi-Model Inference. R package version 1.48.4. https://CRAN.R-project.org/package=MuMIn .
sjPlot	Lüdtke D (2024) sjPlot: Data Visualization for Statistics in Social Science. R package version 2.8.16. https://CRAN.R-project.org/package=sjPlot .
Tidyr	Wickham H, Vaughan D, Girlich M (2023b) tidyr: Tidy Messy Data. R package version 1.3.0. https://CRAN.R-project.org/package=tidyr .
Tidyverse	Wickham H, Averick M, Bryan J <i>et al.</i> (2019) Welcome to the Tidyverse. <i>Journal of Open Source Software</i> , 4 , 1686. https://doi.org/10.21105/joss.01686 .

Table A.2 Corrected Akaike Information Criterion (AICc) for each model that was considered for further analysis. Chosen models with lowest AICcs are printed in bold. Abbreviations: prec = winter precipitation; temp = winter soil temperature.

Variable	Transformatio	Explanatories	Random effects	AICc
Winter root growth	rank	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site/Treatment/Tube) + (1 Depth)	12716
		Prec * Min temp + Long-term prec		12712
		Prec * Coldest month mean temp + Long-term prec		12717
		Prec * Min temp		12717
Summer root growth	rank	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site/Treatment/Tube) + (1 Depth)	12381
		Prec * Min temp + Long-term prec		12383
		Prec * Coldest month mean temp + Long-term prec		12382
		Prec * Mean temp		12388
Radial tree growth	log	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site)	100.6
		Prec * Min temp + Long-term prec		102.8
		Prec * Coldest month mean temp + Long-term prec		100.5
		Prec * Coldest month mean temp		106.6
		Prec * Coldest month mean temp + Long-term summer		106.8
		Prec * Coldest month mean temp + Long-term annual prec		109.2
Winter green tea decomposition	-	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site/Treatment)	-668.6
		Prec * Min temp + Long-term prec		-659.1
		Prec * Coldest month mean temp + Long-term prec		-667.3
		Prec * Mean temp		-673.3
Summer green tea decomposition	-	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site/Treatment)	-650.7
		Prec * Min temp + Long-term prec		-644.5
		Prec * Coldest month mean temp + Long-term prec		-647.9
		Prec * Mean temp		-655.1
Winter red tea decomposition	-	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site/Treatment)	-750.1
		Prec * Min temp + Long-term prec		-749.0
		Prec * Coldest month mean temp + Long-term prec		-749.4
		Prec * Mean temp		-759.6

Summer red tea decomposition	-	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site/Treatment)	-645.4
		Prec * Min temp + Long-term prec		-644.7
		Prec * Coldest month mean temp + Long-term prec		-646.5
		Prec * Coldest month mean temp		-657.5
Winter NO ₃ -N availability	log	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site)	181.2
		Prec * Min temp + Long-term prec		187.7
		Prec * Coldest month mean temp + Long-term prec		180.3
		Prec * Coldest month mean temp		176.6
Summer NO ₃ -N availability	log	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site)	135.7
		Prec * Min temp + Long-term prec		136.0
		Prec * Coldest month mean temp + Long-term prec		134.8
		Prec * Coldest month mean temp		130.6
Winter NH ₄ -N availability	log	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site)	110.4
		Prec * Min temp + Long-term prec		116.3
		Prec * Coldest month mean temp + Long-term prec		108.7
		Prec * Min temp		104.4
Summer NH ₄ -N availability	log	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site)	85.9
		Prec * Min temp + Long-term prec		79.9
		Prec * Coldest month mean temp + Long-term prec		86.0
		Prec * Min temp		73.8
Winter S availability	log	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site)	106.8
		Prec * Min temp + Long-term prec		106.7
		Prec * Coldest month mean temp + Long-term prec		104.8
		Prec * Coldest month mean temp		103.3
Summer S	log	Prec * Mean temp + Long-term prec	(1 Year) + (1 Site)	78.8
		Prec * Min temp + Long-term prec		77.9
		Prec * Coldest month mean temp + Long-term prec		87.9
		Prec * Min temp		72.5