

Supplementary Material

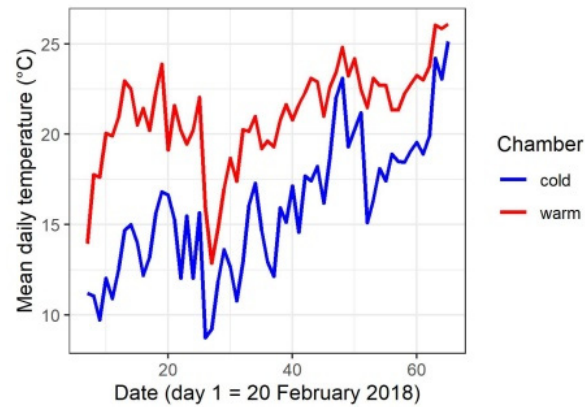


Figure S1. Mean daily temperatures in the two growth chambers in the spring of 2018.

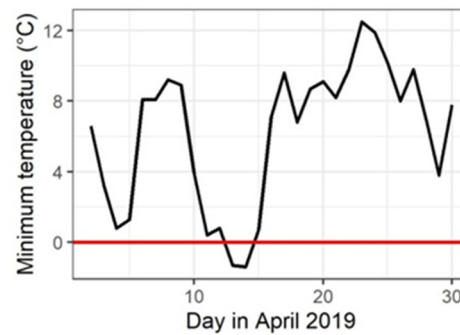


Figure S2. Daily minimum temperatures at Destelbergen in the spring of 2019 (9 km from the trial).

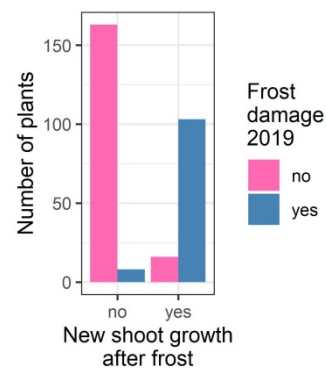


Figure S3. Number of plants that displayed frost damage versus number of plants that produced new shoot growth after the frost event.

Table S1. Number of seedlings according to the temperature treatment in the spring of 2018 and the presence/absence of frost damage in the spring of 2019.

Temperature treatment spring 2018	Frost damage spring 2019	n° of plants
cold	no	81
cold	yes	65
warm	no	98
warm	yes	46

Table S2. Model statistics for the response variables height increment and diameter increment in 2018. H_i is the plant height at the beginning of 2018, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Height increment 2018				Diameter increment 2018			
	Estimate	Std. error	t-value	p-value	Estimate	Std. error	t-value	p-value
(Intercept)	3.31	2.03	1.63	0.104	1.15	0.19	6.08	< 0.001***
H _i	0.38	0.12	3.16	0.002**	0.01	0.01	0.78	0.437
T	-1.53	0.52	-2.92	0.004**	-0.31	0.05	-5.73	< 0.001***
P _{FW_l}	1.48	1.95	0.76	0.457	-0.38	0.16	-2.32	0.030*
P _{FC_l}	1.79	1.69	1.06	0.301	-0.21	0.14	-1.50	0.147
P _{FR_l}	-1.01	1.49	-0.68	0.505	-0.33	0.12	-2.71	0.013*
P _{Fh_l}	0.29	2.48	0.12	0.907	-0.01	0.21	-0.05	0.959
P _{Fh_nl}	0.84	1.74	0.48	0.634	-0.28	0.15	-1.92	0.068
P _{Fb_nl}	-0.48	1.73	-0.28	0.784	0.06	0.14	0.41	0.686
P _S	-1.62	1.42	-1.14	0.267	-0.32	0.12	-2.70	0.013*
P _W	-2.77	1.92	-1.44	0.164	-0.38	0.16	-2.39	0.026*
P _N	-0.18	1.70	-0.10	0.918	-0.37	0.14	-2.60	0.016*

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S3. Model statistics for the response variables height increment and diameter increment in 2019. H₂ is the plant height at the beginning of 2019, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared), Fr is frost damage occurrence after the late spring frost in 2019 (categorical variable with frost damage as the standard level to which no frost damage is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Height increment 2019				Diameter increment 2019			
	Estimate	Std. error	t-value	p-value	Estimate	Std. error	t-value	p-value
(Intercept)	8.07	1.92	4.21	< 0.001***	1.73	0.19	9.01	< 0.001***
H ₂	0.25	0.06	4.00	< 0.001***	0.02	0.01	2.82	0.005**
T	-0.77	0.71	-1.09	0.278	0.30	0.07	4.11	< 0.001***
Fr	-3.14	0.79	-3.96	< 0.001***	-0.27	0.08	-3.34	0.001**
P _{FW_l}	0.68	2.14	0.32	0.753	-0.07	0.20	-0.33	0.741
P _{FC_l}	-0.81	1.88	-0.43	0.669	0.49	0.18	2.71	0.013*
P _{FR_l}	-1.03	1.61	-0.64	0.528	-0.01	0.15	-0.06	0.954
P _{Fh_l}	-0.78	2.65	-0.30	0.770	-0.04	0.25	-0.14	0.887
P _{Fh_nl}	-2.37	1.85	-1.28	0.213	0.03	0.18	0.19	0.847
P _{Fb_nl}	-1.46	1.94	-0.75	0.459	-0.21	0.19	-1.12	0.275
P _S	-0.60	1.58	-0.38	0.708	0.12	0.15	0.81	0.427
P _W	-1.38	2.10	-0.66	0.518	-0.05	0.20	-0.24	0.815
P _N	-1.31	1.87	-0.70	0.489	0.10	0.18	0.58	0.566

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S4. Model statistics for the response variables height increment and diameter increment in 2020. H₃ is the plant height at the beginning of 2020, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared), Fr is frost damage occurrence after the late spring frost in 2019 (categorical variable with frost damage as the standard level to which no frost damage is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Height increment 2020				Diameter increment 2020			
	Estimate	Std. error	t-value	p-value	Estimate	Std. error	t-value	p-value
(Intercept)	19.01	1.97	9.63	< 0.001***	2.72	0.26	10.64	< 0.001***
H ₃	-0.16	0.04	-3.98	< 0.001***	0.02	0.01	2.93	0.004**
T	1.79	0.71	2.53	0.012*	0.00	0.09	0.04	0.971
Fr	-0.77	0.80	-0.96	0.340	-0.06	0.11	-0.60	0.546
P _{FW_l}	2.88	2.33	1.24	0.229	-0.19	0.29	-0.65	0.522
P _{FC_l}	0.46	2.05	0.22	0.826	0.00	0.26	0.00	0.997
P _{FR_l}	0.13	1.77	0.07	0.943	-0.14	0.22	-0.62	0.543
P _{Fh_l}	0.43	2.91	0.15	0.883	-0.09	0.37	-0.25	0.805
P _{Fh_nl}	0.41	2.01	0.20	0.842	0.05	0.25	0.20	0.843
P _{Fb_nl}	-3.00	2.12	-1.42	0.170	0.01	0.27	0.03	0.976
P _S	-1.25	1.73	-0.72	0.477	0.11	0.22	0.52	0.606
P _W	-1.55	2.31	-0.67	0.508	0.17	0.29	0.57	0.573
P _N	0.26	2.05	0.13	0.900	0.20	0.26	0.75	0.458

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S5. Model statistics for the response variable bud burst in 2018. H₁ is the plant height at the beginning of 2018, D is the day of observation, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Estimate	Std. error	z-value	p-value
H ₁	0.02	0.11	0.16	0.872
D	-0.98	0.07	-14.51	< 0.001***
T	-19.12	1.75	-10.89	< 0.001***
D:T	0.28	0.04	6.60	< 0.001***
P _{FW_l}	1.04	1.99	0.52	0.603
P _{FC_l}	0.86	1.73	0.50	0.618
P _{FR_l}	-1.59	1.53	-1.04	0.298
P _{Fh_l}	1.28	2.55	0.50	0.617
P _{Fh_nl}	-0.15	1.77	-0.09	0.930
P _{Fb_nl}	-4.73	1.78	-2.65	0.008**
P _S	0.88	1.46	0.60	0.548
P _W	0.43	1.98	0.22	0.829
P _N	2.89	1.76	1.65	0.099

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S6. Model statistics for the response variables leaf senescence in 2018 and bud burst in 2019. H₂ is the plant height at the end of 2018, D is the day of observation, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Leaf senescence 2018				Bud burst 2019			
	Estimate	Std. error	z-value	p-value	Estimate	Std. error	z-value	p-value
H ₂	0.14	0.04	3.52	< 0.001***	-0.04	0.02	-1.83	0.067
D	0.46	0.04	11.04	< 0.001***	-0.44	0.03	-17.24	< 0.001***
T	1.57	0.47	3.33	< 0.001***	0.73	0.25	2.86	0.004**
D:T	-0.07	0.02	-2.83	0.005**	-0.44	0.03	-17.24	< 0.001***
P _{FW_l}	1.35	1.18	1.15	0.251	0.48	0.88	0.54	0.589
P _{FC_l}	0.64	1.01	0.64	0.525	-0.56	0.77	-0.72	0.469
P _{FR_l}	0.28	0.88	0.32	0.747	-1.53	0.66	-2.31	0.021*
P _{Fh_l}	-0.43	1.47	-0.29	0.771	0.10	1.09	0.09	0.925
P _{Fh_nl}	0.26	1.03	0.25	0.804	-0.66	0.76	-0.87	0.382
P _{Fb_nl}	-0.21	1.05	-0.20	0.838	-2.20	0.78	-2.82	0.005**
P _S	1.07	0.85	1.26	0.206	-2.72	0.65	-4.16	< 0.001***
P _W	1.29	1.14	1.13	0.258	-0.91	0.87	-1.06	0.291
P _N	1.53	1.03	1.50	0.135	0.06	0.77	0.07	0.943

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S7. Model statistics for the response variable frost damage in the spring of 2019. H₂ is the plant height at the beginning of 2019, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Estimate	Std. error	t-value	p-value
(Intercept)	-1.35	0.72	-1.86	0.062
H ₂	0.00	0.02	0.12	0.906
T	-0.56	0.27	-2.10	0.036*
P _{FW_l}	-1.33	1.16	-1.16	0.248
P _{FC_l}	1.06	0.64	1.65	0.098
P _{FR_l}	1.39	0.56	2.49	0.013*
P _{Fh_l}	-0.71	1.19	-0.59	0.552
P _{Fh_nl}	0.70	0.64	1.10	0.274
P _{Fb_nl}	2.19	0.66	3.32	< 0.001***
P _S	1.94	0.55	3.50	< 0.001***
P _W	1.13	0.70	1.61	0.107
P _N	0.55	0.66	0.84	0.403

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S8. Model statistics for the reponse variable relative chlorophyll content. H₂ is the plant height at the end of 2018, D is the day of observation, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared), Fr is the frost damage in the spring of 2019 (categorical variable with absence of frost damage as standard level to which presence of frost damage is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Linear part (spring and summer)				Non-linear part (autumn)			
	Estimate	Std. error	t-value	p-value	Estimate	Std. error	t-value	p-value
(Intercept)	6.35	0.33	19.11	< 0.001***	5.36	0.41	12.98	< 0.001***
H ₂	-0.05	0.01	-3.95	< 0.001***	-0.08	0.01	-5.77	< 0.001***
D	-0.01	0.00	-5.53	< 0.001***	-42.94	1.21	-35.58	< 0.001***
D ²					-17.84	1.21	-14.78	< 0.001***
T	0.20	0.13	1.51	0.133	0.51	0.16	3.11	0.002**
Fr	1.22	0.14	8.48	< 0.001***	1.19	0.18	6.56	< 0.001***
P _{FW_l}	-0.55	0.33	-1.65	0.112	0.06	0.42	0.14	0.889
P _{FC_l}	-0.07	0.29	-0.23	0.822	0.34	0.37	0.92	0.366
P _{FR_l}	0.62	0.24	2.53	0.019*	0.32	0.32	1.00	0.330
P _{Fh_l}	-0.11	0.41	-0.26	0.799	0.01	0.52	0.01	0.989
P _{Fh_nl}	0.17	0.28	0.63	0.538	0.31	0.37	0.86	0.398
P _{Fb_nl}	0.12	0.30	0.39	0.701	-0.22	0.39	-0.57	0.575
P _S	0.95	0.24	3.94	0.001	0.24	0.32	0.77	0.447
P _W	0.22	0.32	0.67	0.508	0.23	0.42	0.55	0.589
P _N	-0.25	0.29	-0.88	0.389	0.23	0.37	0.61	0.550

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S9. Model statistics for the response variables leaf senescence in 2019 and bud burst in 2020. H₃ is the plant height at the end of 2019, D is the day of observation, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared), Fr is the frost damage in the spring of 2019 (categorical variable with absence of frost damage as standard level to which presence of frost damage is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Leaf senescence 2019				Bud burst 2020			
	Estimate	Std. error	z-value	p-value	Estimate	Std. error	z-value	p-value
H ₃	0.08	0.02	4.45	< 0.001***	-0.02	0.03	-0.68	0.495
D	0.08	0.01	9.32	< 0.001***	-2.18	0.12	-17.68	< 0.001***
T	-0.58	0.31	-1.83	0.067	-0.21	0.62	-0.34	0.738
Fr	-1.59	0.36	-4.36	< 0.001***	-4.34	0.73	-5.98	< 0.001***
P _{FW_l}	0.27	0.75	0.36	0.716	0.91	1.52	0.60	0.550
P _{FC_l}	0.06	0.66	0.09	0.927	0.70	1.34	0.53	0.598
P _{FR_l}	0.07	0.57	0.12	0.905	0.12	1.14	0.10	0.917
P _{Fh_l}	-0.34	0.91	-0.38	0.706	-1.96	1.85	-1.06	0.289
P _{Fh_nl}	0.16	0.64	0.26	0.798	-3.98	1.30	-3.05	0.002**
P _{Fb_nl}	0.12	0.71	0.17	0.866	-2.65	1.41	-1.87	0.061
P _S	0.03	0.57	0.06	0.955	-3.87	1.15	-3.36	0.001**
P _W	-0.28	0.76	-0.37	0.712	-0.44	1.50	-0.30	0.767
P _N	-0.70	0.67	-1.04	0.300	2.53	1.36	1.86	0.063

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S10. Model statistics for the response variables leaf senescence in 2020. H₄ is the plant height at the end of 2020, D is the day of observation, T is the temperature treatment in the spring of 2018 (categorical variable with the cold condition as standard level to which the warm condition is compared), Fr is the frost damage in the spring of 2019 (categorical variable with absence of frost damage as standard level to which presence of frost damage is compared) and P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Variable	Estimate	Std. error	z-value	p-value
H ₄	0.16	0.05	3.25	0.001**
D	0.44	0.11	3.99	< 0.001***
T	0.18	0.68	0.26	0.793
Fr	0.77	0.79	0.98	0.328
P _{FW_l}	2.51	2.30	1.09	0.277
P _{FC_l}	-0.63	2.04	-0.31	0.756
P _{FR_l}	1.53	1.71	0.89	0.372
P _{Fh_l}	0.01	2.84	0.00	0.998
P _{Fh_nl}	0.95	1.89	0.50	0.614
P _{Fb_nl}	1.27	2.07	0.62	0.539
P _S	0.61	1.69	0.36	0.719
P _W	-0.98	2.36	-0.42	0.678
P _N	-0.84	2.08	-0.40	0.686

*** p < 0.001; ** p < 0.01; * p < 0.05.

Table S11. Model statistics for the response variables height and diameter in 2017. P is the provenance (categorical variable with Sonian as the standard provenance to which the other provenances are compared). Abbreviations of provenances are in Table 1.

Height 2017					Diameter 2017			
Variable	Estimate	Std. error	t-value	p-value	Estimate	Std. error	t-value	p-value
(Intercept)	14.10	0.89	15.92	< 0.001***	2.26	0.15	15.27	< 0.001***
P _{FW_l}	3.50	1.53	2.28	0.033*	0.54	0.26	2.11	0.047*
P _{FC_l}	1.38	1.35	1.02	0.319	0.45	0.23	2.00	0.058
P _{FR_l}	1.22	1.19	1.03	0.314	0.27	0.20	1.35	0.190
P _{Fh_l}	2.91	1.98	1.47	0.156	0.20	0.33	0.59	0.560
P _{Fh_nl}	3.74	1.35	2.77	0.011*	0.61	0.23	2.69	0.013*
P _{Fb_nl}	-1.03	1.36	-0.75	0.459	-0.26	0.23	-1.15	0.263
P _S	-0.53	1.14	-0.46	0.648	0.02	0.19	0.13	0.900
P _W	-0.29	1.54	-0.19	0.850	-0.03	0.26	-0.10	0.923
P _N	-0.89	1.36	-0.66	0.517	0.09	0.23	0.41	0.687

*** p < 0.001; ** p < 0.01; * p < 0.05.