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Article

Stable Allometric Trajectories in *Picea abies* (L.) Karst. Trees along an Elevational Gradient

Supplementary Materials

Datasets for this study have been made publicly accessible on the Zenodo platform and can be found in the repository "*Allometric trajectories in Picea abies [L.] Karst. trees remain stable despite differences in temperature, phenology and growth along an elevational gradient.*" at doi:10.5281/zenodo.4126736.

1. Temperature Imputation

Logistic problems prevented us from installing temperature loggers (HOBO 8K pendant® waterproof, Onset Computer Corporation, 470 MacArthur Blvd., Bourne, MA) in the field before the 3rd of July. We calculated temperature for the missing period (15th of May to 3rd of July) by imputation, modelling the relationship between each plot and the Evenstad weather station, located 4 km away from the sites. Slope and coefficient values defining the relationship between each plot and the weather station are provided in **Table S1**.

Table S1: Intercept and slope values defining the relationship between the temperature in each plot and the Evenstad weather station. These values were used to compute missing temperature values for the period ranging from the 15th of May to the 3rd of July.

Plot	Intercept	Intercept SE	Slope	Slope SE
A1	-1,95	0,12	1,2	0,007
A2	-2,51	0,13	1,25	0,008
A3	-1,96	0,12	1,17	0,007
A4	-1,73	0,12	1,21	0,007
A5	-1,57	0,12	1,19	0,007
B1	-1,96	0,13	1,17	0,008
B2	-1,44	0,133	1,184	0,008
B3	-0,98	0,11	1,13	0,007
B4	-1,19	0,12	1,16	0,007
B5	-2,86	0,14	1,25	0,009
C1	-2,17	0,14	1,16	0,008
C2	-1,52	0,13	1,11	0,008
C3	-1,96	0,13	1,16	0,008
C4	-2,15	0,14	1,18	0,009
C5	-3,81	0,31	1,26	0,016
D1	-1,98	0,14	1,14	0,009
D2	-0,64	0,14	1,06	0,009
D3	-1,53	0,15	1,13	0,009
D4	-1,15	0,14	1,1	0,009
D5	-0,29	0,15	1,05	0,009

2. Post-hoc Tests p-values

In order to ascertain statistical differences between growing conditions in our sites, we applied ANOVA analysis to temperature, bud break, tree dimension and tree growth during the season. Since ANOVA only signals that 'at least' one site differs from the others for the investigated parameter, we ran post-hoc tests that perform multiple comparisons between each possible pairing of sites and establish statistical differences across all four sites. Where it was possible to apply parametric ANOVA, we then applied Tukey post-hoc tests. Where we applied non-parametric Kruskal-Wallis ANOVA, we then applied Dunn post-hoc test. **Table S2** provides statistical parameters calculated by post-hoc tests for each site pairing and for each parameter.

Table S2. Results for post-hoc tests performed to identify statistical differences between sites. "Comparison" columns indicate the two sites being compared. Significance levels for p-values: "***" 0.001, "**" 0.01, "*" 0.05. Z = Z value for Dunn test; p.unadj = unadjusted p-value for Dunn test; p.adj = p-value adjusted to multiple comparisons; diff = difference in average between compared sites; lwr = lower value for 95% C.I.; upr = upper value for 95% C.I.

Temperatures (Dunn)			
Comparison	**Z**	**p.unadj**	**p.adj**
A - B	0.821	0.412	0.4939
A - C	3.847	0.000	0.0007***
B - C	3.026	0.002	0.0050**
A - D	3.333	0.001	0.0026**
B - D	2.512	0.012	0.0180*
C - D	-0.514	0.607	0.6073

Bud Break (Dunn)			
Comparison	**Z**	**p.unadj**	**p.adj**
A - B	0.82	0.41	0.492
A - C	-1.88	0.06	0.091
B - C	-2.69	0.01	0.021*
A - D	-2.62	0.01	0.018*
B - D	-3.45	0.00	0.003**
C - D	-0.70	0.48	0.481

Tree Height (Tukey)				
Comparison	**diff**	**lwr**	**upr**	**p adj**
D-C	1.119	-17.359	19.598	0.99862
B-C	30.090	11.703	48.477	0.00020***
A-C	33.611	15.133	52.090	0.00003***
B-D	28.971	10.680	47.261	0.00035***
A-D	32.492	14.109	50.875	0.00005***
A-B	3.521	-14.770	21.812	0.95922

Tree Diameter (Dunn)			
Comparison	**Z**	**p.unadj**	**p.adj**
A - B	-0.3620	0.7173	0.7173
A - C	3.9479	0.0001	0.0002***
B - C	4.2891	0.0000	0.0001***
A - D	2.7281	0.0064	0.0096**
B - D	3.0774	0.0021	0.0042**
C - D	-1.2401	0.2149	0.2579

Normalized Apical shoot elongation (Tukey)				
Comparison	**diff**	**lwr**	**upr**	**p adj**
B-A	0.032	-0.009	0.074	0.184
C-A	0.042	0.000	0.084	0.048*
D-A	0.009	-0.033	0.050	0.950
C-B	0.010	-0.032	0.051	0.933
D-B	-0.024	-0.065	0.018	0.449
D-C	-0.033	-0.075	0.008	0.165

Normalized Diameter Increment (Dunn)			
Comparison	**Z**	**p.unadj**	**p.adj**
A - B	-1.062	0.288	0.346
A - C	-2.834	0.005	0.014*
B - C	-1.757	0.079	0.118
A - D	-3.515	0.000	0.003**
B - D	-2.428	0.015	0.030*
C - D	-0.666	0.505	0.505

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