Supplemental Information for:

Environmental effects on fine-scale spatial genetic structure in four Alpine keystone forest tree species

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Table S1. Overview of life-history traits for the four Alpine tree species (*Abies alba*, *Larix decidua*, *Picea abies*, *Pinus cembra*) included in the study.

Species	**Elevation [m]**	**Leaf type**	**Flowering**	**Seed maturity**	**Seed size**	**Mast frequency [years]**	**Pollination**	**Seed dispersal**	**Age of maturity [years]**	**Lifespan [years]**
Abies alba	800-1700	coniferous	April-June	autumn	6-9 mm	4-5	wind	wind	40-50	ca. 400
Larix decidua	1000-2000	deciduous	March-May	autumn	4-5 mm	3-6	wind	wind	35-40	600-800
Picea abies	800-2200	coniferous	April-June	winter	3-5 mm	3-4	wind	wind	40-50	ca. 500
Pinus cembra	1100-2300	coniferous	June-August	spring (after chilling)	1 cm	4-10	wind	bird	40	ca. 600

Table S2. Sampling site description, including geographic location, elevation (m a.s.l.), a proxy for population density in regular stands (basal area in m^2/ha), biogeographic regions (Geo) with respect to Adige River (E: East, W: West), soil type (C: calcareous; S: siliceous), inter-annual variability in spring temperature (*SD_springTemp*) and spring precipitation (*precQ2*).

Species	Sites	ID	Latitude	Longitude	Elevation	Density	Geo	Soil type	*SD_springTemp*	*precQ2*
A. alba	Madonna-Neve-soil	P1	10.878722	45.725076	1,168	272.17	W	C	4.218	276
	Paganella_W_1	P2	10.981938	46.138724	1,187	233.51	W	C	4.009	246
	Paganella_W_3	P3	11.005386	46.144467	1,581	408.03	W	C	4.157	234
	Telve-Musiera-soil	P4	11.477499	46.117701	1,288	382.00	E	S	4.022	258
	Val-Genova-soil-2	P5	10.727176	46.168461	940	265.59	W	S	3.734	265
	Val-Sella-soil-1	P6	11.417164	45.990183	1,340	297.79	E	C	4.088	294
L. decidua	Bosco-Lares-soil-1	P7	11.540398	45.980058	1,707	281.54	E	C	4.287	304
	Lamola-soil-2	P8	10.726131	46.152325	1,883	472.40	W	S	3.823	265
	Mga Cagnon-soil-2	P9	11.389507	46.154913	1,906	258.08	E	S	4.113	258
	Mga Clesera-soil-1	P10	10.932386	46.317676	1,881	317.34	W	C	4.013	221
	Rabbi-S_1	P11	10.817027	46.413165	1,480	306.30	W	S	4.013	221
	Rabbi-S_3	P12	10.849145	46.424766	2,144	291.87	W	S	4.013	221
	Val-Peio-1	P13	10.670114	46.362113	1,631	297.16	W	S	3.713	287
	Val-Peio-3	P14	10.665377	46.374677	2,217	373.92	W	S	3.713	287
P. cembra	Bormio-soil-1	P15	10.421254	46.443667	2,053	302.51	W	S	3.974	249
	Passo-Oclini-Soil-2	P16	11.452383	46.343651	2,032	248.89	E	C	4.156	213
	Val-Mare-soil-2	P17	10.684679	46.415134	2,149	235.05	W	S	3.713	287
	Passo-Sella-S_1	P18	11.774174	46.527293	1,885	339.06	E	S	3.946	286
	Passo-Sella-S-3	P19	11.750942	46.511680	2,227	257.51	E	C	3.946	286
P. abies	Ridanna_S_1	P20	11.332782	46.903460	1,242	276.20	E	S	4.139	293
	Ridanna_S_3	P21	11.338962	46.909536	1,701	542.95	E	S	4.140	293
	Bedole-soil-2	P22	10.590928	46.194666	1,683	240.82	W	S	4.413	262
	Mga_Movlina-soil-1	P23	10.809029	46.146185	1,757	184.32	W	C	4.135	233
	Moena-soil-2	P24	11.765685	46.417754	1,879	462.53	E	S	4.391	290
	Paneveggio-soil-1	P25	11.763760	46.290502	1,805	192.99	E	C	4.330	290

Table S3. Distance classes (in meters) used for fine-scale spatial genetic structure (FSGS) analyses; average number of tree pairs per population per species included in each distance class is given between parentheses.

Species	1	2	3	4	5	6
A. alba	0-10 (346)	10-25 (347)	25-50 (347)	50-100 (346)	100-150 (347)	> 250 (347)
L. decidua	0-20 (346)	20-30 (347)	30-60 (347)	60-100 (346)	100-150 (347)	> 250 (347)
P. cembra	0-10 (346)	10-25 (347)	25-50 (347)	50-100 (346)	100-150 (347)	> 250 (347)
P. abies	0-10 (346)	10-25 (347)	25-50 (347)	50-100 (346)	100-150 (347)	> 250 (347)

Figure S1. Box plots and a scatter-plot showing non-significant differences in FSGS, as evaluated by *Sp*, across (**A**) biogeographic regions (West or East of the Adige River), (**B**) soil types (Calcareous or Siliceous) and (**C**) elevation; the discontinuous line in the scatter-plot indicates *Sp*=0.