Supplementary Materials

Maps of the density of plots

Figures S1 to S7 present the maps of the density of plots, both for conspecific adult trees (*Quercus* spp.) and for forest plantations of *P. pinaster* and *E. globulus*, for the three predefined neighbourhoods.

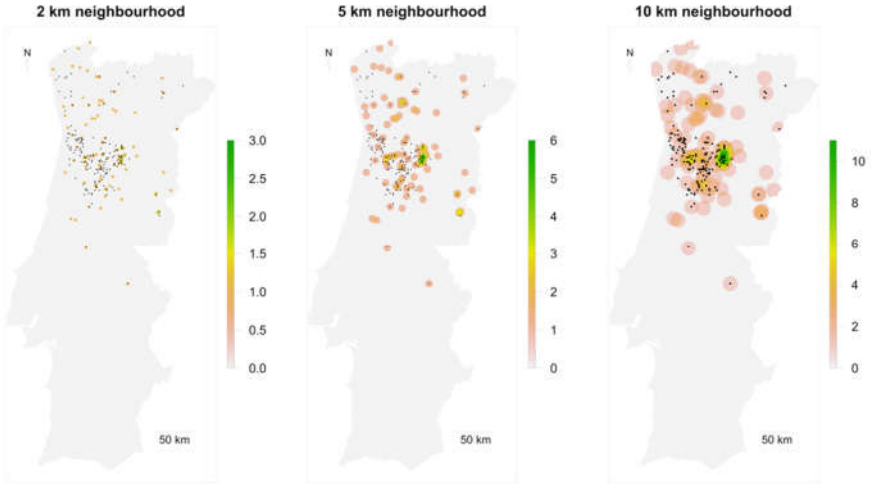

Figure S1. Maps of the no. of plots dominated or co-dominated by *Q. robur* adult trees (SeedAvail) in predefined neighbourhoods. Black dots represent sites where *Q. robur* saplings were found.

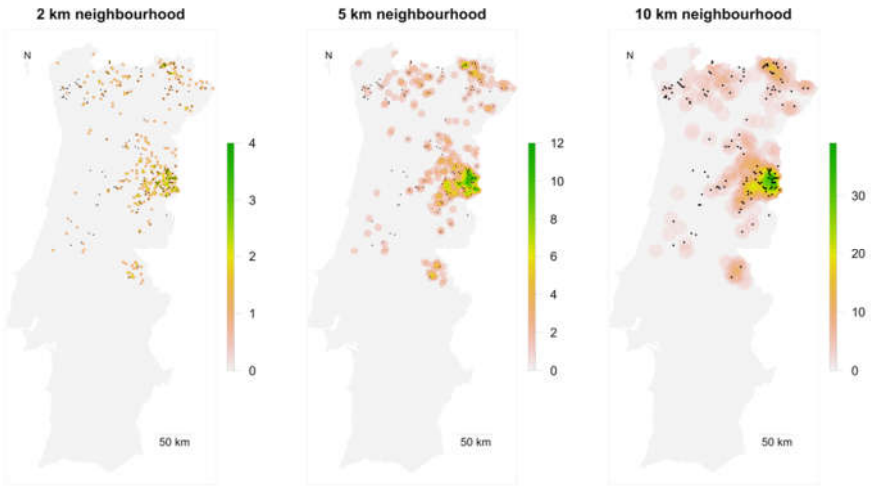

Figure S2. Maps of the no. of plots dominated or co-dominated by *Q. pyrenaica* adult trees (SeedAvail) in predefined neighbourhoods. Black dots represent sites where *Q. pyrenaica* saplings were found.

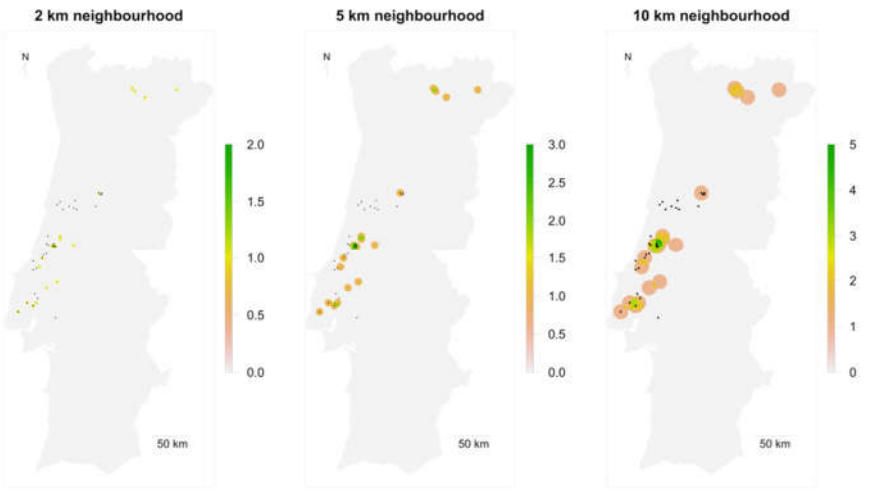

Figure S3. Maps of the no. of plots dominated or co-dominated by *Q. broteroi* adult trees (SeedAvail) in predefined neighbourhoods. Black dots represent sites where *Q. broteroi* saplings were found.

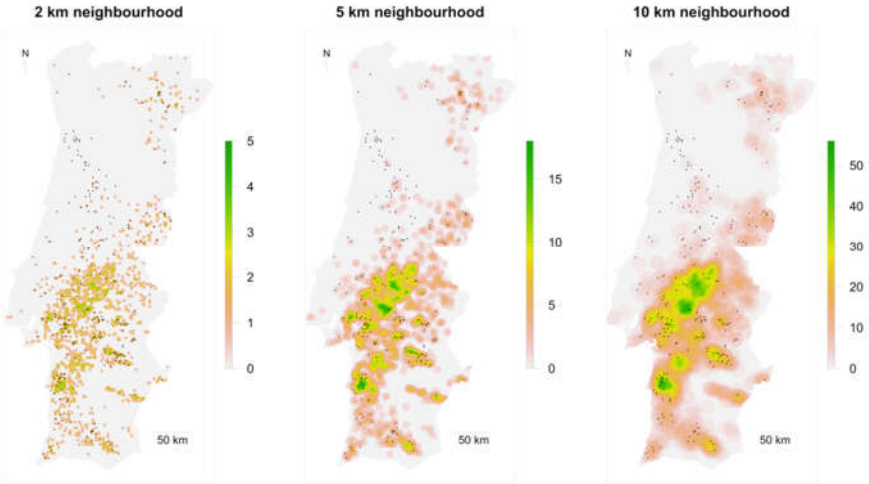

Figure S4. Maps of the no. of plots dominated or co-dominated by *Q. suber* adult trees (SeedAvail) in predefined neighbourhoods. Black dots represent sites where *Q. suber* saplings were found.

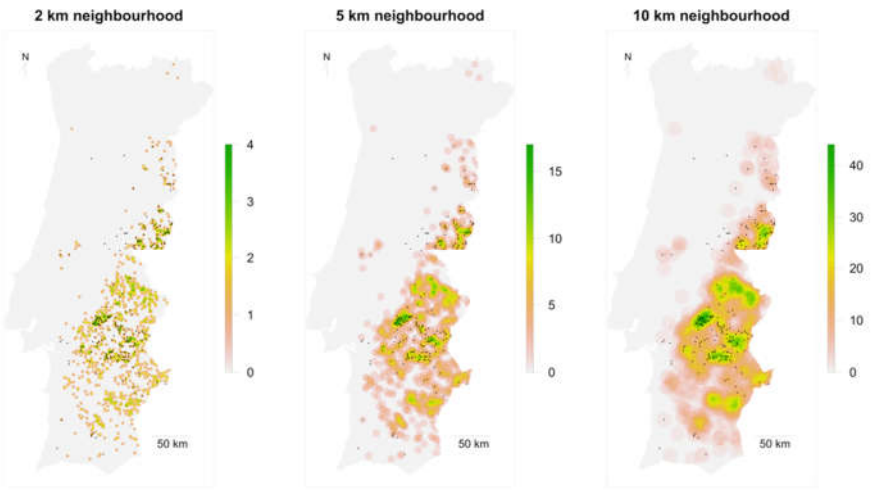

Figure S5. Maps of the no. of plots dominated or co-dominated by *Q. rotundifolia* adult trees (SeedAvail) in predefined neighbourhoods. Black dots represent sites where *Q. rotundifolia* saplings were found.

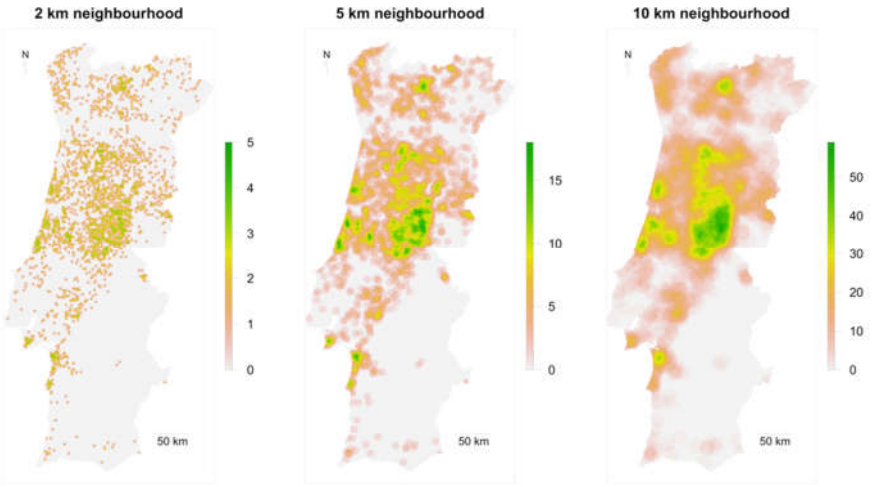

Figure S6. Maps of the no. of plots dominated or co-dominated by *P. pinaster* adult trees (DensPp) in predefined neighbourhoods.

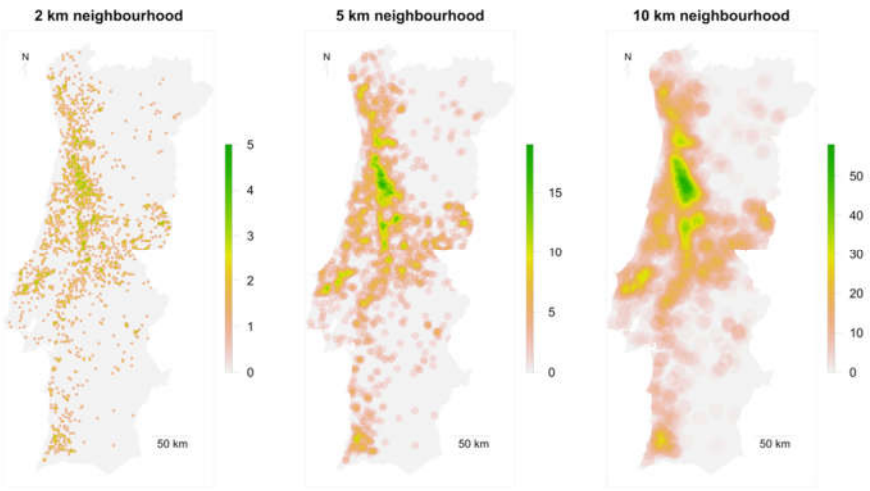

Figure S7. Maps of the no. of plots dominated or co-dominated by *E. globulus* adult trees (DensEg) in predefined neighbourhoods.

Pearson product-moment correlation coefficients

Figures S8 to S12 present, for each species dataset (outliers removed), the Pearson product-moment correlation coefficient for the variables used in the models, represented as ellipses using function *plotcorr* from package 'ellipse' [117]. Note that variables presenting coefficient values greater than 0.7, although represented, were never used simultaneously in the same model component.

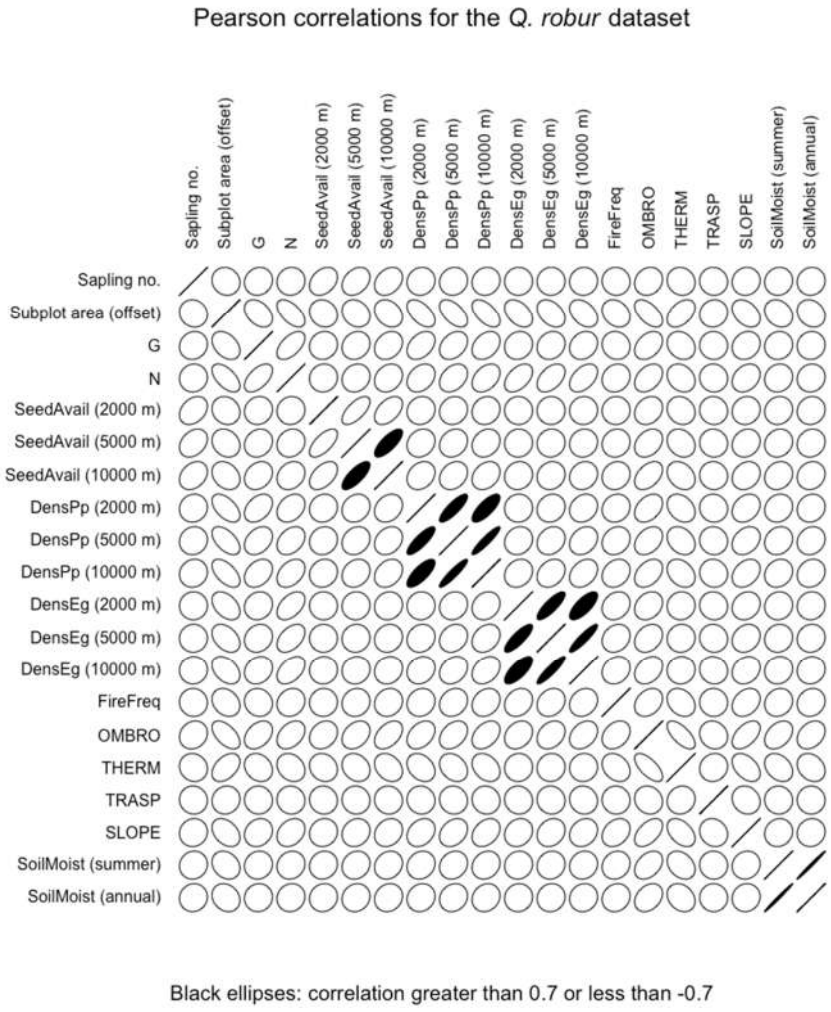

Figure S8. Pearson correlation coefficients (represented as ellipses) between pairs of variables used in the *Q. robur* models (*n*=4167).

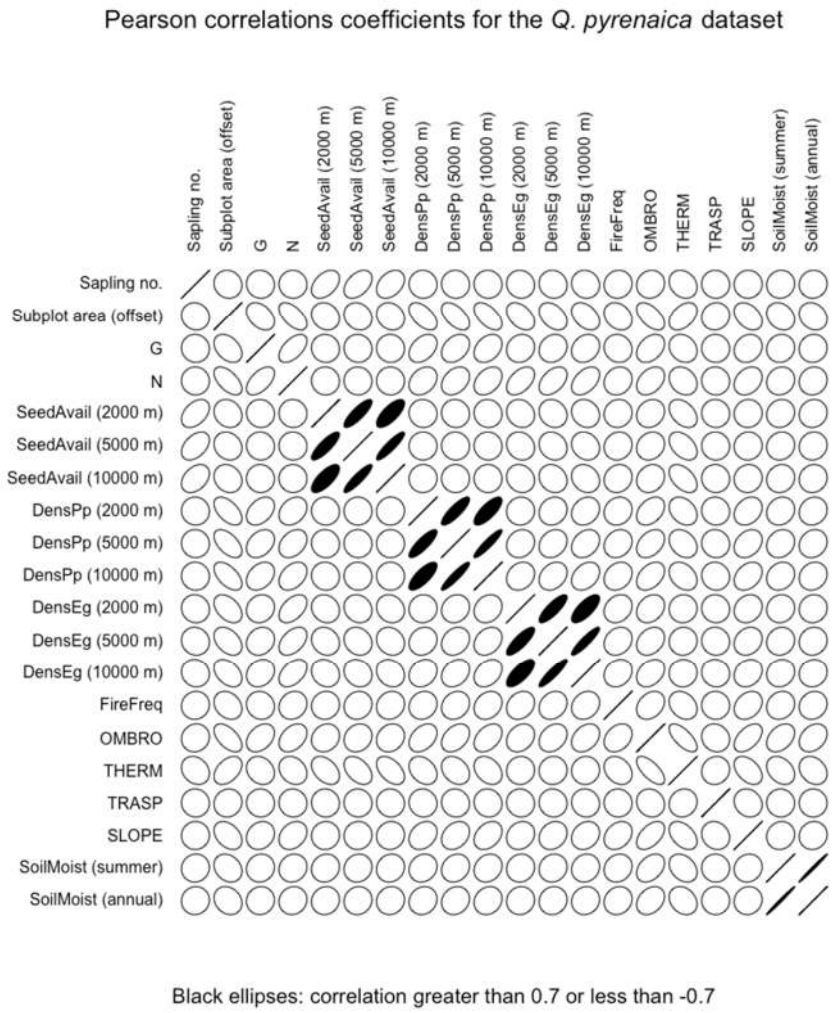

Figure S9. Pearson correlation coefficients (represented as ellipses) between pairs of variables used in the *Q. pyrenaica* models (*n*=4461).

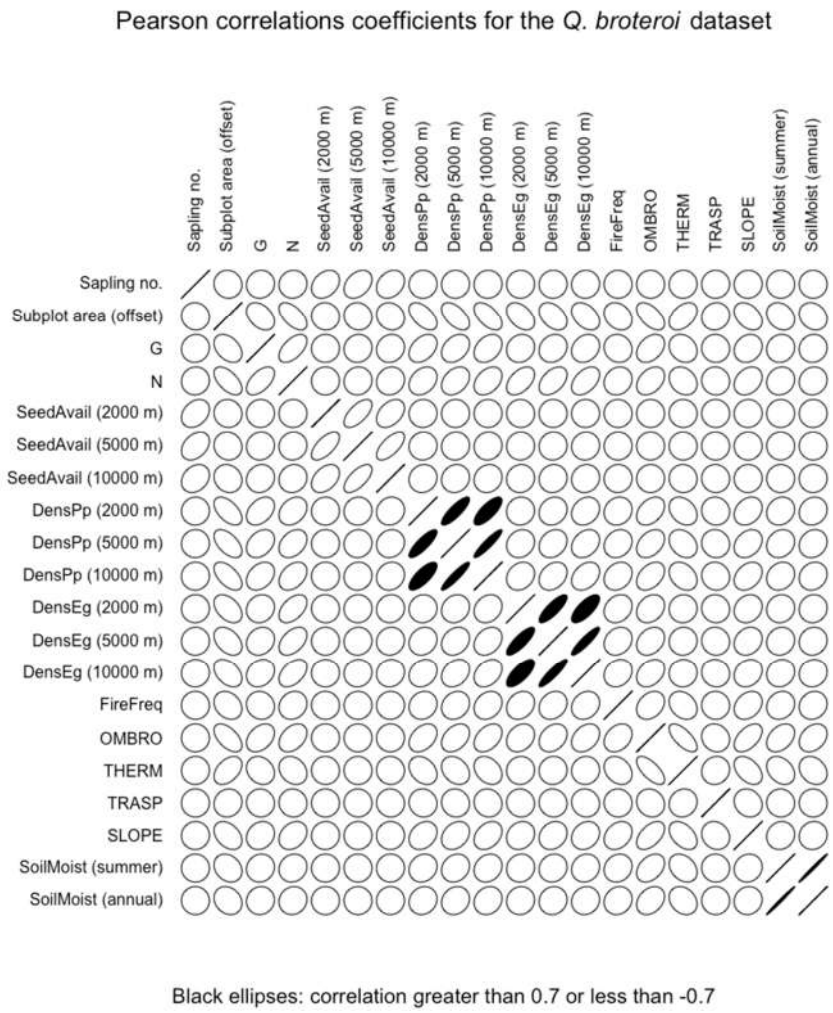

Figure S10. Pearson correlation coefficients (represented as ellipses) between pairs of variables used in the *Q. broteroi* models (n=4631).

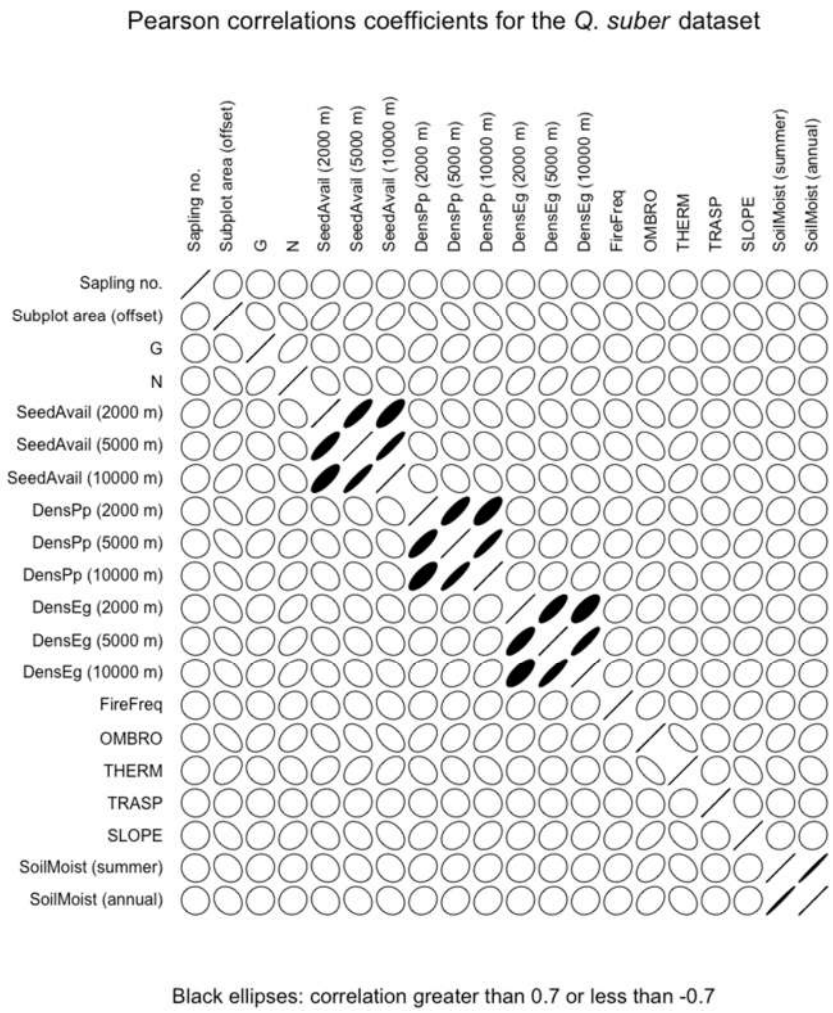

Figure S11. Pearson correlation coefficients (represented as ellipses) between pairs of variables used in the *Q. suber* models (n=4485).

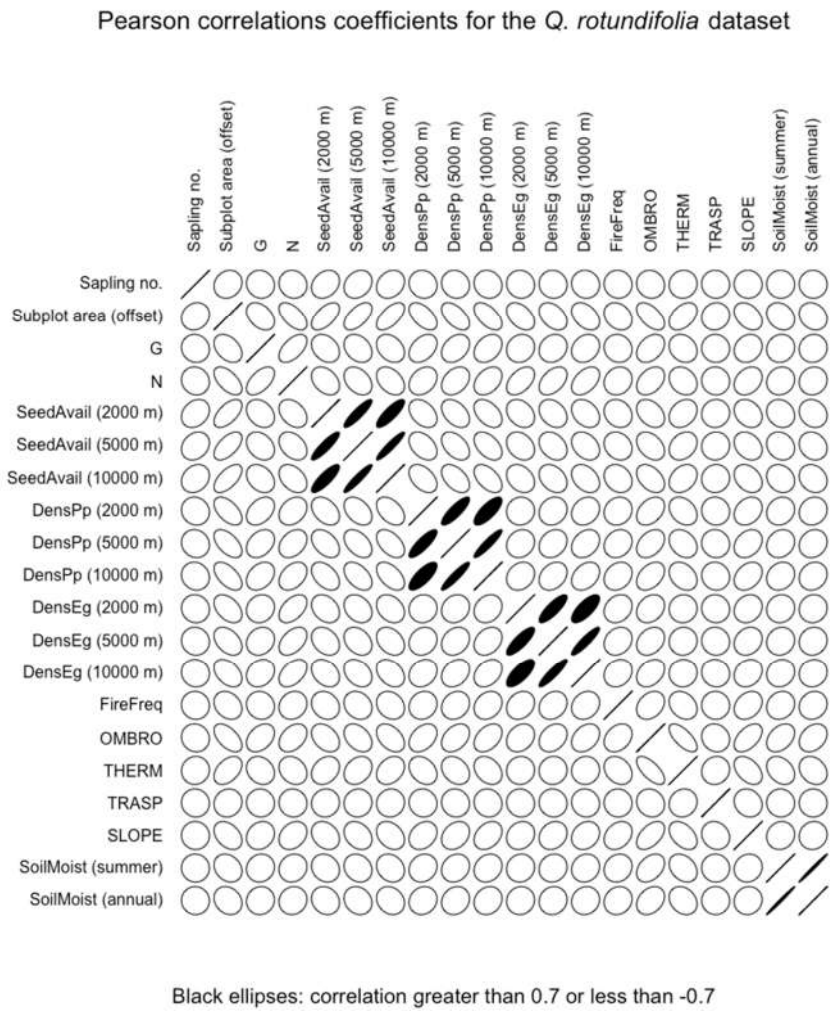

Figure S12. Pearson correlation coefficients (represented as ellipses) between pairs of variables used in the *Q. rotundifolia* models (*n*=4642).

Summary statistics for each species dataset

Tables S1 to S5 present for each species dataset (outliers removed) the respective summary statistics.

Table S1. Summary statistics for the *Q. robur* dataset (*n*=4167).

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
NUMERIC VARIABLES:						
Sapling no.	0.00	0.00	0.00	0.19	0.00	43.00
Subplot area (offset)	50	50	50	107	200	200
G	0.013	2.581	6.131	9.313	12.676	80.249
N	0.025	0.325	2.798	7.071	11.021	73.150
SeedAvail (2000 m)	0.000	0.000	0.000	0.031	0.000	2.586
SeedAvail (5000 m)	0.00	0.00	0.00	0.14	0.00	6.00
SeedAvail (10000 m)	0.00	0.00	0.00	0.44	0.00	10.70
DensPp (2000 m)	0.00	0.00	0.50	0.76	1.47	3.77
DensPp (5000 m)	0.0	0.0	2.0	3.4	6.0	18.0
DensPp (10000 m)	0.0	1.0	7.6	11.4	17.9	57.0
DensEg (2000 m)	0.0	0.0	0.0	0.6	1.0	3.8
DensEg (5000 m)	0.0	0.0	1.0	2.7	4.0	19.0
DensEg (10000 m)	0.0	1.0	5.2	9.0	14.5	54.5
FireFreq	0.00	0.00	0.00	0.31	0.00	6.00
OMBRO	0.21	0.54	0.70	0.96	1.26	4.63
THERM	122	297	333	317	349	413
TRASP	0.017	0.250	0.629	0.543	0.933	0.983
SLOPE	0.000	0.046	0.085	0.116	0.159	0.681
SoilMoist (summer)	3.1	4.8	5.6	5.9	6.5	17.2
SoilMoist (annual)	5.5	6.6	7.4	7.7	8.3	18.9
CATEGORICAL VARIABLES:						
GRAZI	'yes': 808 'no': 3359					
UnderClear	'yes': 486 'no': 3681					
TSLFire	'≤ 5 years': 309 '> 5 years':3858					
SPMType	'siliceous loamy': 1977 'siliceous heavy': 2190					

Table S2. Summary statistics for the *Q. pyrenaica* dataset (*n*=4461).

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
NUMERICAL VARIABLES:						
Sapling no.	0.00	0.00	0.00	0.25	0.00	65.00
Subplot area (offset)	50	50	50	108	200	200
G	0.013	2.585	6.043	9.238	12.520	80.249
N	0.025	0.300	2.798	6.971	10.793	73.150
SeedAvail (2000 m)	0.000	0.000	0.000	0.068	0.000	3.145
SeedAvail (5000 m)	0.00	0.00	0.00	0.26	0.00	11.00
SeedAvail (10000 m)	0.00	0.00	0.00	0.88	0.00	36.79
DensPp (2000 m)	0.00	0.00	0.00	0.73	1.21	3.77
DensPp (5000 m)	0.0	0.0	2.0	3.3	5.0	18.0
DensPp (10000 m)	0	1	7	11	17	57
DensEg (2000 m)	0.00	0.00	0.00	0.59	1	3.76
DensEg (5000 m)	0.0	0.0	1.0	2.6	4.0	19.0
DensEg (10000 m)	0.0	1.0	5.0	8.8	13.9	54.5
FireFreq	0.0	0.0	0.0	0.3	0.0	6.0
OMBRO	0.21	0.54	0.69	0.94	1.23	4.63
THERM	122	299	334	318	349	413
TRASP	0.017	0.250	0.629	0.544	0.933	0.983
SLOPE	0.000	0.046	0.084	0.114	0.157	0.681
SoilMoist (summer)	3.1	4.8	5.6	5.8	6.5	17.2
SoilMoist (annual)	5.5	6.6	7.3	7.7	8.3	18.9
CATEGORICAL VARIABLES:						
GRAZI	'yes': 889 'no': 3572					
UnderClear	'yes': 513 'no': 3948					
TSLFire	'≤ 5 years': 320 '> 5 years':4141					
SPMType	'basic heavy': 301 'siliceous loamy': 1973 'siliceous heavy': 2187					

Table S3. Summary statistics for the *Q. broteroi* dataset (*n*=4631).

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
NUMERICAL VARIABLES:						
Sapling no.	0.000	0.000	0.000	0.014	0.000	6.000
Subplot area (offset)	50	50	50	108	200	200
G	0.013	2.619	6.089	9.287	12.571	80.249
N	0.025	0.300	2.798	6.983	10.793	73.150
SeedAvail (2000 m)	0.0000	0.0000	0.0000	0.0051	0.0000	1.508
SeedAvail (5000 m)	0.000	0.000	0.000	0.018	0.000	3.000
SeedAvail (10000 m)	0.000	0.000	0.000	0.059	0.000	4.515
DensPp (2000 m)	0.00	0.00	0.00	0.73	1.20	3.77
DensPp (5000 m)	0.0	0.0	2.0	3.3	5.0	18.0
DensPp (10000 m)	0	1	7	11	17	57
DensEg (2000 m)	0.00	0.00	0.00	0.59	1.00	3.76
DensEg (5000 m)	0.0	0.0	1.0	2.6	4.0	19.0
DensEg (10000 m)	0.0	1.0	5.0	8.7	14.0	54.5
FireFreq	0.00	0.00	0.00	0.29	0.00	6.00
OMBRO	0.21	0.54	0.69	0.94	1.22	4.63
THERM	122	300	334	318	349	413
TRASP	0.017	0.250	0.629	0.546	0.933	0.983
SLOPE	0.000	0.046	0.084	0.114	0.157	0.681
SoilMoist (summer)	3.1	4.8	5.6	5.8	6.5	17.2
SoilMoist (annual)	5.5	6.6	7.3	7.7	8.3	18.9
CATEGORICAL VARIABLES:						
GRAZI	'yes': 929 'no': 3702					
UnderClear	'yes': 537 'no': 4094					
TSLFire	'≤ 5 years': 328 '> 5 years':4303					
SPMType	'basic heavy': 302 'intermediate loamy': 170 'siliceous loamy': 1973 'siliceous heavy': 2186					

Table S4. Summary statistics for the *Q. suber* dataset (*n*=4485).

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
NUMERICAL VARIABLES:						
Sapling no.	0.00	0.00	0.00	0.17	0.00	35.00
Subplot area (offset)	50	50	50	109	200	200
G	0.013	2.584	6.032	9.213	12.478	80.249
N	0.025	0.300	2.798	6.943	10.793	73.150
SeedAvail (2000 m)	0.0	0.0	0.0	0.6	1.0	3.7
SeedAvail (5000 m)	0.0	0.0	1.0	2.7	4.0	18.0
SeedAvail (10000 m)	0.0	0.0	3.0	8.7	13.9	51.4
DensPp (2000 m)	0.00	0.00	0.00	0.73	1.20	3.77
DensPp (5000 m)	0.0	0.0	2.0	3.3	5.0	18.0
DensPp (10000 m)	0	1	7	11	17	57
DensEg (2000 m)	0.00	0.00	0.00	0.59	1.00	3.76
DensEg (5000 m)	0.0	0.0	1.0	2.6	4.0	19.0
DensEg (10000 m)	0.0	1.0	5.0	8.7	13.9	54.5
FireFreq	0.0	0.0	0.0	0.3	0.0	6.0
OMBRO	0.21	0.54	0.69	0.94	1.23	4.63
THERM	122	300	334	319	349	413
TRASP	0.017	0.250	0.629	0.544	0.933	0.983
SLOPE	0.000	0.046	0.085	0.115	0.158	0.681
SoilMoist (summer)	3.1	4.8	5.6	5.8	6.5	17.2
SoilMoist (annual)	5.5	6.6	7.3	7.7	8.3	18.9
CATEGORICAL VARIABLES:						
GRAZI	'yes': 896 'no': 3589					
UnderClear	'yes': 518 'no': 3967					
TSLFire	'≤ 5 years': 326 '> 5 years':4159					
SPMType	'basic heavy': 302 'siliceous loamy': 1979 'siliceous heavy': 2204					

Table S5. Summary statistics for the *Q. rotundifolia* dataset (*n*=4642).

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
NUMERIC VARIABLES:						
Sapling no.	0.0	0.0	0.0	0.4	0.0	89.0
Subplot area (offset)	50	50	50	109	200	200
G	0.013	2.604	6.070	9.271	12.555	80.249
N	0.025	0.300	2.798	6.968	10.793	73.150
SeedAvail (2000 m)	0.00	0.00	0.00	0.41	0.53	3.73
SeedAvail (5000 m)	0.0	0.0	0.0	1.7	2.0	16.0
SeedAvail (10000 m)	0.0	0.0	0.0	5.2	8.0	43.1
DensPp (2000 m)	0.00	0.00	0.00	0.73	1.19	3.77
DensPp (5000 m)	0.0	0.0	2.0	3.2	5.0	18.0
DensPp (10000 m)	0	1	7	11	17	57
DensEg (2000 m)	0.00	0.00	0.00	0.59	1.00	3.76
DensEg (5000 m)	0.0	0.0	1.0	2.6	4.0	19.0
DensEg (10000 m)	0.0	1.0	5.0	8.7	14.0	54.5
FireFreq	0.00	0.00	0.00	0.29	0.00	6.00
OMBRO	0.21	0.54	0.69	0.94	1.22	4.63
THERM	122	300	334	319	349	413
TRASP	0.017	0.25	0.629	0.546	0.933	0.983
SLOPE	0.000	0.046	0.084	0.114	0.157	0.681
SoilMoist (summer)	3.1	4.8	5.6	5.8	6.5	17.2
SoilMoist (annual)	5.5	6.6	7.3	7.7	8.3	18.9
CATEGORICAL VARIABLES:						
GRAZI	'yes': 934 'no': 3708					
UnderClear	'yes': 537 'no': 4105					
TSLFire	'≤ 5 years': 330 '> 5 years':4312					
SPMType	'basic heavy': 302 'intermediate loamy': 169 'siliceous loamy': 1976 'siliceous heavy': 2195					

Sapling boxplots for all datasets

Figure S13 presents the sapling counts boxplots (zero saplings not represented) for all datasets, indicating which observations were removed from the analysis, when applicable.

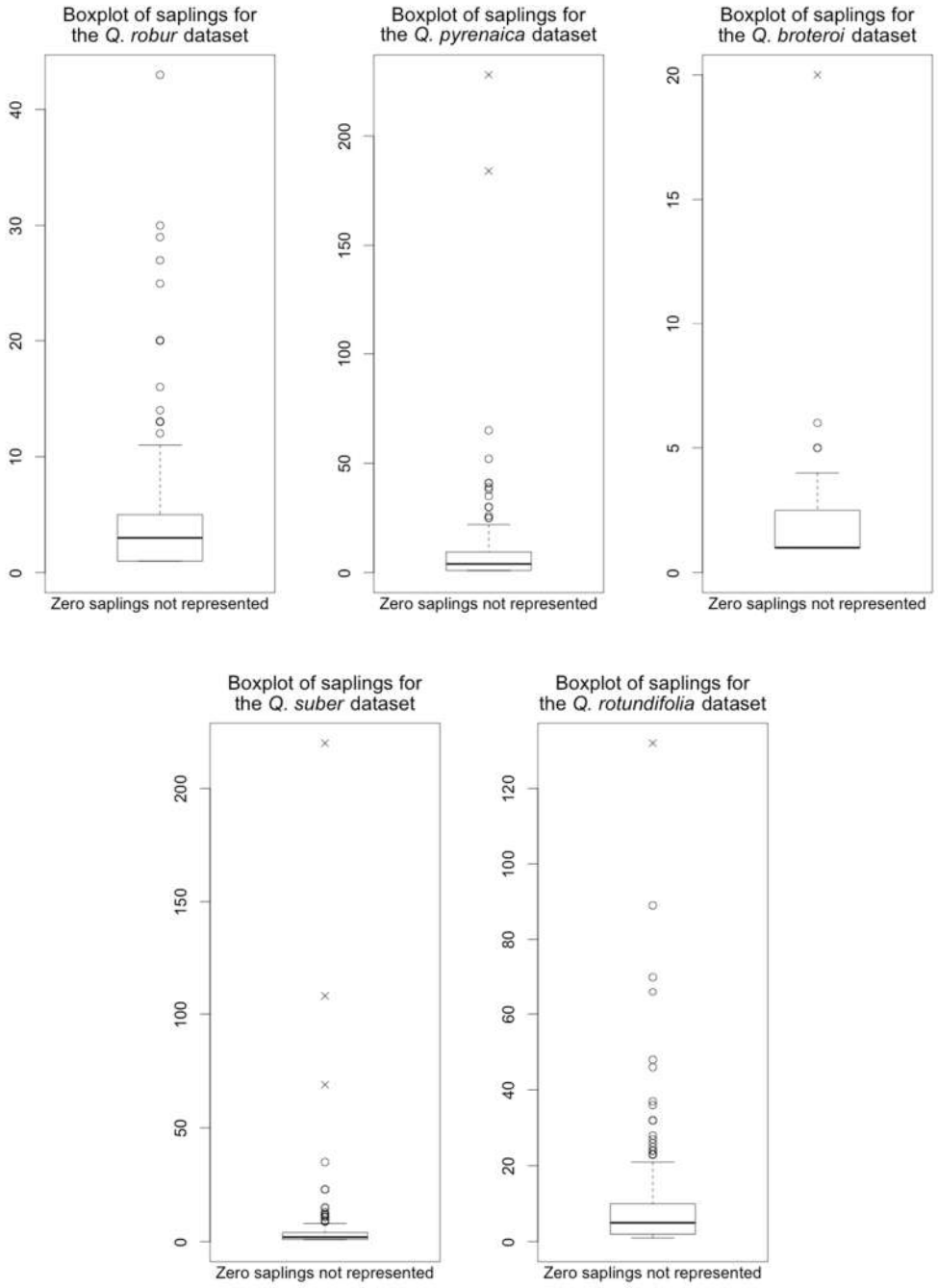

Figure S13. Sapling counts boxplots for all datasets. Whiskers extend 1.5 times the interquartile range. Outside whiskers, circles indicate observations that were used in the analysis, while crosses those removed.

Plots of sorted AIC and sorted Akaike weights

Figures S14 to S18 show the plots of sorted AIC and sorted Akaike weights, for each taxon, and the respective fraction of the first models, which summed up to 0.95 of Akaike weight.

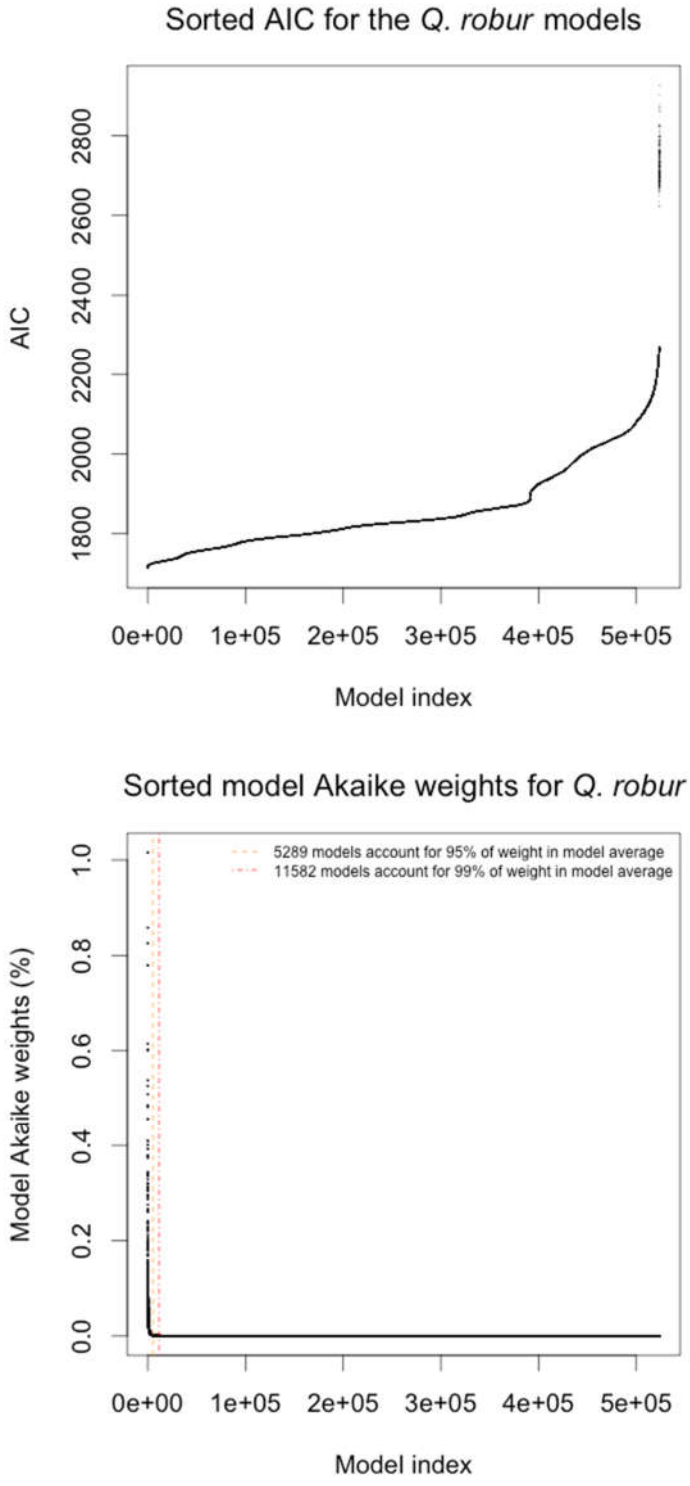

Figure S14. Top: Sorted AIC of all 524 288 fitted models for *Q. robur*. Bottom: Sorted model Akaike weights, for *Q. robur* and the respective fraction of the first models, which sum up to 0.95 and 0.99 of Akaike weight.

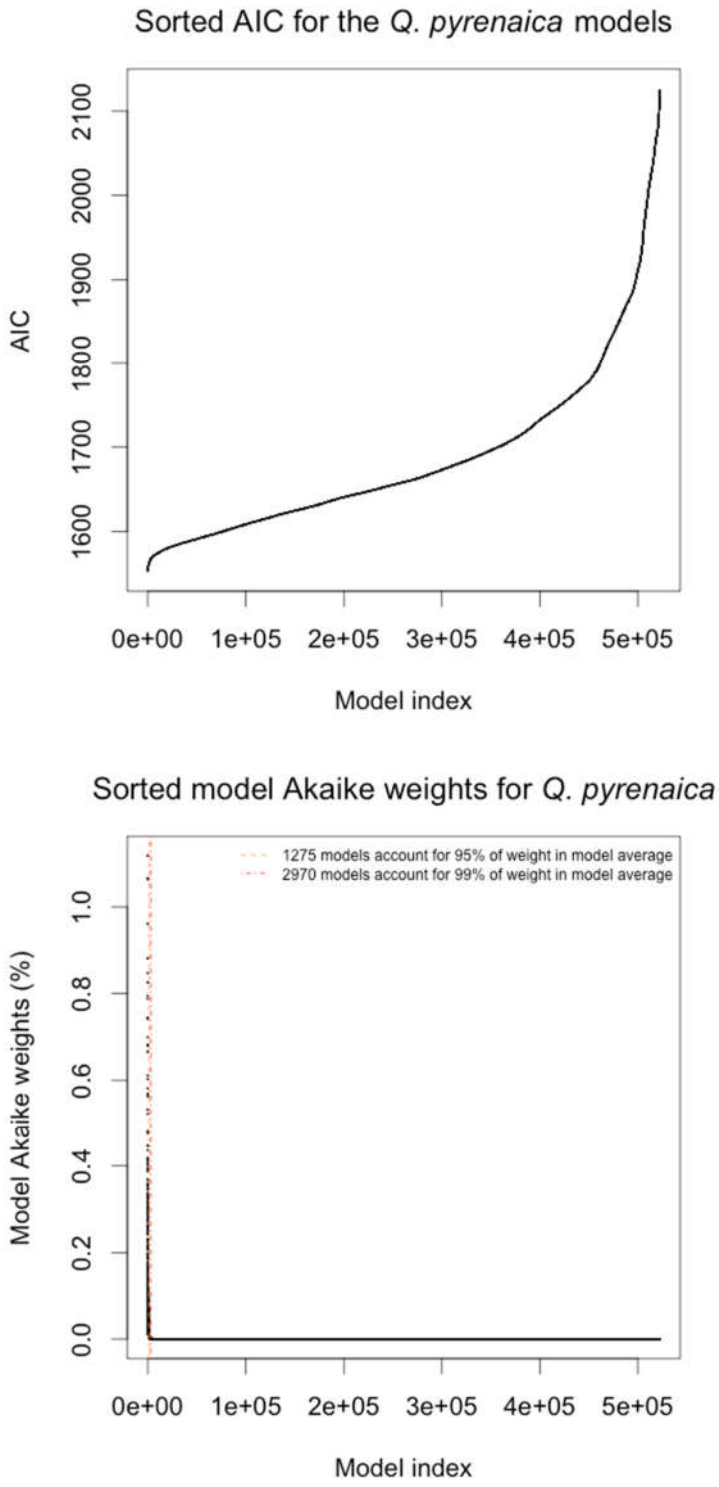

Figure S15. Top: Sorted AIC of all 524 288 fitted models for *Q. pyrenaica*. Bottom: Sorted model Akaike weights, for *Q. pyrenaica* and the respective fraction of the first models, which sum up to 0.95 and 0.99 of Akaike weight.

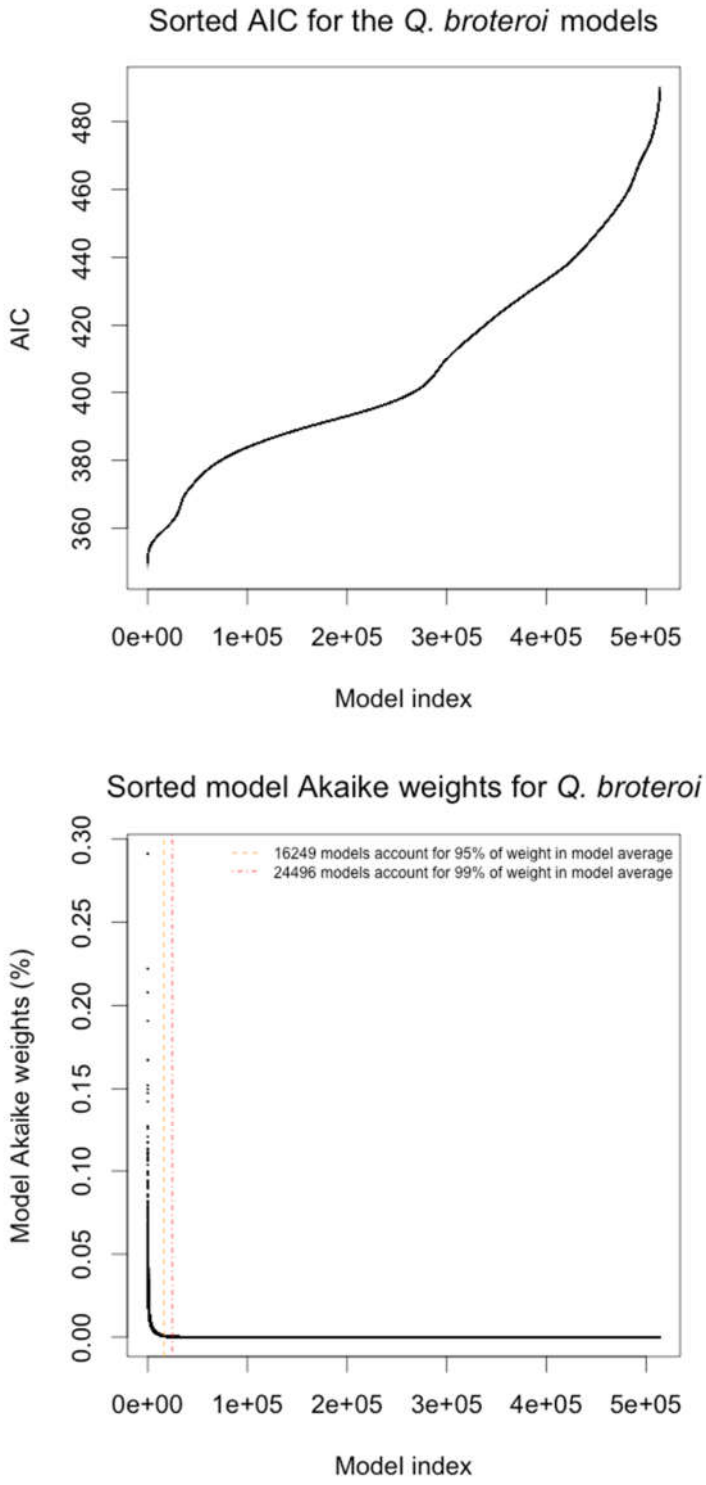

Figure S16. Top: Sorted AIC of all 524 288 fitted models for *Q. broteroi*. Bottom: Sorted model Akaike weights, for *Q. broteroi* and the respective fraction of the first models, which sum up to 0.95 and 0.99 of Akaike weight.

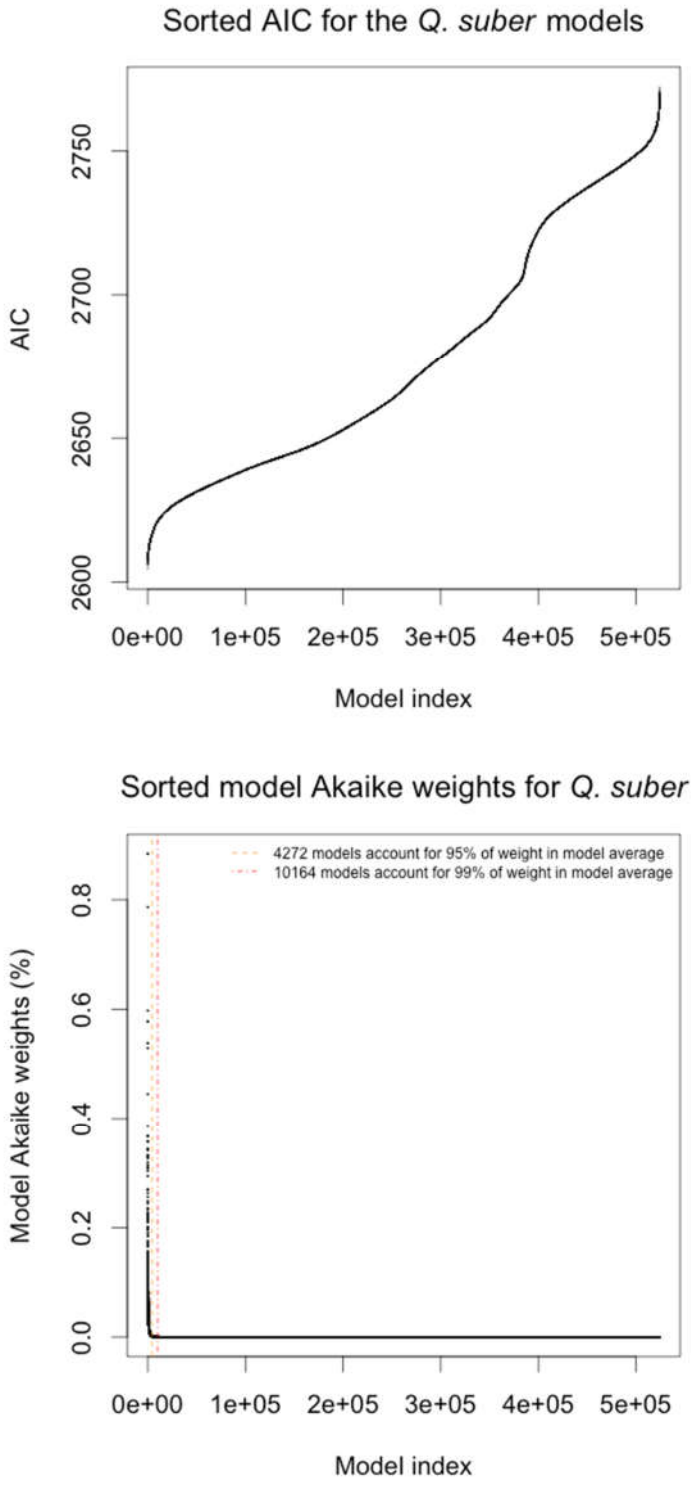

Figure S17. Top: Sorted AIC of all 524 288 fitted models for *Q. suber*. Bottom: Sorted model Akaike weights, for *Q. suber* and the respective fraction of the first models, which sum up to 0.95 and 0.99 of Akaike weight.

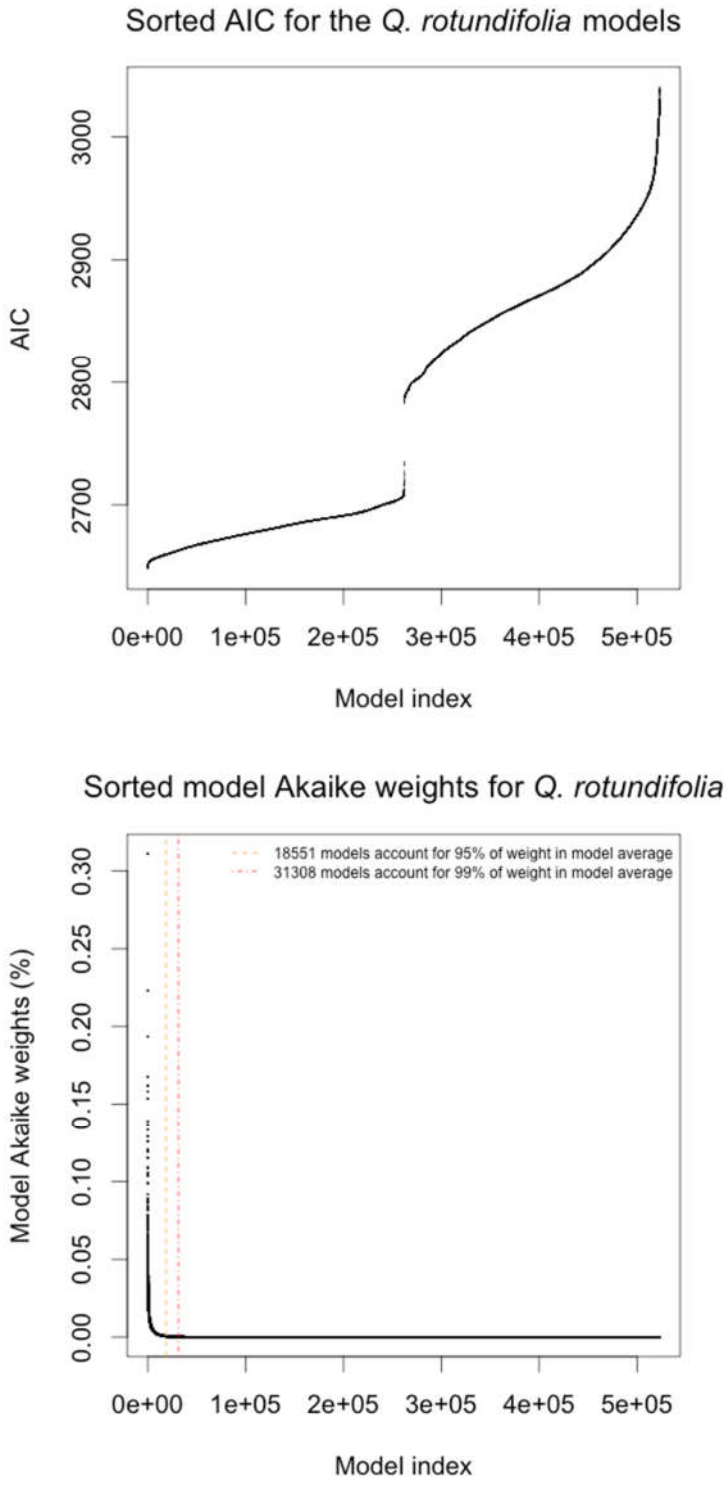

Figure S18. Top: Sorted AIC of all 524 288 fitted models for *Q. rotundifolia*. Bottom: Sorted model Akaike weights, for *Q. rotundifolia* and the respective fraction of the first models, which sum up to 0.95 and 0.99 of Akaike weight.

Summary outputs of the best models (lower AIC), for each taxon

Tables S6 to S10 present the summary outputs of the best fitted model (lower AIC) for each taxon.

Table S6. Summary output of the best fitted model for *Q. robur*.

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.42243	-0.07450	-0.03188	-0.02335	28.98887

Count model coefficients (negbin with log link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-3.88178	0.32458	-11.959	< 2e-16	***
G	0.30414	0.10843	2.805	0.00503	**
N	-0.33491	0.12889	-2.598	0.00937	**
FireFreq	-0.76563	0.11829	-6.472	9.64e-11	***
OMBRO	-0.40260	0.14693	-2.740	0.00614	**
SeedAvail(2000m)	0.21022	0.04707	4.466	7.97e-06	***
UnderClear'yes'	-0.53587	0.33762	-1.587	0.11247	
TRASP	-0.26459	0.11104	-2.383	0.01718	*
DensPp(10000m)	0.34260	0.15733	2.178	0.02944	*
Log(theta)	-1.70844	0.16641	-10.267	< 2e-16	***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	3.3524	0.2824	11.871	< 2e-16	***
OMBRO	-2.1986	0.3751	-5.862	4.58e-09	***
THERM	-0.5965	0.2350	-2.539	0.0111	*
SeedAvail(10000m)	-1.8418	0.2996	-6.148	7.84e-10	***
SoilMoist(summer)	-0.4742	0.1908	-2.485	0.0130	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Theta = 0.1811

Number of iterations in BFGS optimization: 32

Log-likelihood: -841.3 on 15 Df

AIC: 1712.655

Table S7. Summary output of the best fitted model for *Q. pyrenaica*.

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.42278	-0.07834	-0.02715	-0.01999	22.87039

Count model coefficients (negbin with log link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-4.07775	0.59021	-6.909	4.88e-12	***
G	-0.24065	0.16484	-1.460	0.144310	
N	-0.34212	0.21729	-1.575	0.115368	
FireFreq	-0.31004	0.10369	-2.990	0.002788	**
OMBRO	-0.56819	0.13346	-4.257	2.07e-05	***
SeedAvail(2000m)	0.31033	0.07667	4.047	5.18e-05	***
UnderClear'yes'	-2.00914	0.54404	-3.693	0.000222	***
TRASP	-0.35164	0.12855	-2.736	0.006228	**
GRAZI'no'	0.79409	0.46997	1.690	0.091094	.
SPMType'basic heavy'	1.25389	0.64795	1.935	0.052973	.
SPMType'siliceous heavy'	-0.91805	0.28185	-3.257	0.001125	**
DensPp(2000m)	-0.39315	0.17742	-2.216	0.026693	*
Log(theta)	-1.71865	0.15794	-10.881	< 2e-16	***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	3.6266	0.2964	12.235	< 2e-16	***
OMBRO	-1.7000	0.2994	-5.679	1.36e-08	***
THERM	0.8429	0.2029	4.154	3.27e-05	***
SeedAvail(5000m)	-1.9263	0.4278	-4.503	6.69e-06	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Theta = 0.1793

Number of iterations in BFGS optimization: 55

Log-likelihood: -759.1 on 17 Df

AIC: 1552.154

Table S8. Summary output of the best fitted model for *Q. broteroi*.

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.326068	-0.034510	-0.013010	-0.005281	12.318509

Count model coefficients (negbin with log link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-5.9103	0.7991	-7.396	1.40e-13	***
N	0.5599	0.2706	2.069	0.038545	*
TSLFire'>5years'	-1.4167	0.8374	-1.692	0.090690	.
OMBRO	-1.0942	0.6794	-1.611	0.107247	
THERM	2.1562	1.0740	2.008	0.044673	*
SeedAvail(5000m)	0.4048	0.1174	3.447	0.000567	***
TRASP	0.3853	0.2368	1.627	0.103695	
SoilMoist(annual)	-0.7575	0.3632	-2.086	0.037007	*
DensEg(10000m)	-0.8763	0.3786	-2.315	0.020617	*
Log(theta)	-2.2388	0.3374	-6.635	3.24e-11	***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	1.6123	1.2829	1.257	0.20885	
OMBRO	-11.0447	3.1425	-3.515	0.00044	***
THERM	-5.2729	2.3742	-2.221	0.02636	*
SeedAvail(10000m)	-1.3351	0.3817	-3.497	0.00047	***
SoilMoist(annual)	-1.1585	0.6159	-1.881	0.05998	.

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Theta = 0.1066

Number of iterations in BFGS optimization: 50

Log-likelihood: -158.9 on 15 Df

AIC: 347.7323

Table S9. Summary output of the best fitted model for *Q. suber*.

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.26017	-0.21171	-0.12817	-0.08516	23.24852

Count model coefficients (negbin with log link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-6.6325	0.2131	-31.127	< 2e-16	***
G	0.3587	0.1012	3.546	0.000391	***
OMBRO	-0.7544	0.1569	-4.808	1.52e-06	***
GRAZI'no'	0.8056	0.2305	3.495	0.000473	***
SLOPE	0.5109	0.1241	4.116	3.86e-05	***
DensEg(10000m)	0.3638	0.1276	2.852	0.004348	**
Log(theta)	-2.6560	0.1092	-24.326	< 2e-16	***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-1.0452	0.4626	-2.260	0.023839	*
OMBRO	-1.1043	0.2974	-3.713	0.000205	***
SeedAvail(2000m)	-3.6627	0.6579	-5.567	2.59e-08	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Theta = 0.0702

Number of iterations in BFGS optimization: 34

Log-likelihood: -1292 on 10 Df

AIC: 2604.285

Table S10. Summary output of the best fitted model for *Q. rotundifolia*.

Pearson residuals:

Min	1Q	Median	3Q	Max
-0.30736	-0.09309	-0.06465	-0.03589	27.53076

Count model coefficients (negbin with log link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	-1.4402	0.9605	-1.499	0.13376	
FireFreq	-0.7703	0.3669	-2.100	0.03576	*
TSLFire'>5years'	-1.8227	0.8014	-2.274	0.02294	*
OMBRO	1.5357	0.5851	2.625	0.00867	**
SeedAvail(10000m)	0.3799	0.1199	3.169	0.00153	**
TRASP	-0.2504	0.1174	-2.132	0.03297	*
SLOPE	1.0579	0.2260	4.680	2.86e-06	***
SPMType'siliceous loamy'	-0.7860	0.4951	-1.588	0.11235	
SPMType'basic heavy'	-1.4240	0.6040	-2.358	0.01839	*
SPMType'siliceous heavy'	-1.1160	0.4943	-2.258	0.02397	*
Log(theta)	-2.3414	0.1569	-14.921	< 2e-16	***

Zero-inflation model coefficients (binomial with logit link):

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	2.2019	0.3375	6.523	6.87e-11	***
OMBRO	1.8257	0.4673	3.907	9.36e-05	***
THERM	0.6331	0.2521	2.511	0.0120	*
SeedAvail(2000m)	-2.0592	0.4147	-4.965	6.85e-07	***
SoilMoist(summer)	-0.2835	0.1482	-1.913	0.0558	.

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Theta = 0.0962

Number of iterations in BFGS optimization: 35

Log-likelihood: -1307 on 16 Df

AIC: 2646.774