Table S1. Steps of climate variable selection and model optimization.

Step1: models using one climate variables for site.

List of the top ten models based on the proportion of variance explained (R^2).

No.	Variable	R^2	P-value	Significance
1	DD5_s	0.3291	5.78E-33	***
2	MWMT_s	0.3038	5.11E-30	***
3	MAT_s	0.2757	7.35E-27	***
4	EXT_s	0.2481	6.96E-24	***
5	PAS_s	0.2341	2.07E-22	***
6	Eref_s	0.2174	1.08E-20	***
7	NFFD_s	0.2165	1.32E-20	***
8	EMT_s	0.2091	7.41E-20	***
9	DD_0_s	0.1864	1.34E-17	***
10	MCMT_s	0.1808	4.71E-17	***

Parameters of the quadratic model using the best climate variable selected for site.

AIC=-409.3

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
(Intercept)	-3.10E+00	4.04E-01	-7.662	1.64E-13	***
DD5_s	2.53E-03	2.38E-04	10.62	< 2e-16	***
DD5_s^2	-3.13E-07	3.42E-08	-9.169	< 2e-16	***

Step2: models using one climate variable for provenance.

List of the top ten models based on the proportion of variance explained (R^2).

No.	Variable	R²	P-value	Significance
1	MAT_p	0.1778	9.16E-17	***
2	NFFD_p	0.1675	9.13E-16	***
3	EMT_p	0.1639	2.02E-15	***
4	Eref_p	0.161	3.81E-15	***
5	DD5_p	0.1608	3.97E-15	***
6	DD_0_p	0.16	4.69E-15	***
7	MCMT_p	0.1478	6.68E-14	***
8	MWMT_p	0.1197	2.57E-11	***
9	EXT_p	0.08576	2.64E-08	***
10	PAS_p	0.08055	7.49E-08	***

Parameters of the quadratic model using the best climate variable selected for provenance.

AIC=-334.09

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
(Intercept)	-2.097186	0.589775	-3.556	0.000426	***
MAT_p	0.505041	0.091829	5.5	7.14E-08	***
MAT_p^2	-0.015617	0.003476	-4.492	9.45E-06	***

Step3: models using one climate variables for site and one for provenance, respectively.

List of the top ten models based on the proportion of variance explained (R^2).

No.	Variables	R^2	P-value	Significance
1	DD5_s, MAT_p	0.485	1.92E-51	***
2	DD5_s, NFFD_p	0.4848	2.07E-51	***
3	DD5_s, EMT_p	0.4793	1.38E-50	***
4	DD5_s, DD_0_p	0.4782	2.05E-50	***
5	DD5_s, Eref_p	0.4765	3.63E-50	***
6	DD5_s, MCMT_p	0.4744	7.65E-50	***
7	DD5_s, DD5_p	0.4626	4.17E-48	***
8	MWMT_s, MAT_p	0.4608	7.62E-48	***
9	MAT_p, MWMT_s	0.4608	7.62E-48	***
10	MWMT_s, NFFD_p	0.4572	2.50E-47	***

Parameters of the quadratic model using the best combination of one climate variable for site and one for provenance, respectively.

AIC=-504.2

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
(Intercept)	-4.76E+00	7.32E-01	-6.502	2.62E-10	***
DD5_s	1.95E-03	2.56E-04	7.604	2.46E-13	***
MAT_p	3.25E-01	8.30E-02	3.915	0.000108	***
DD5_s^2	-2.76E-07	3.02E-08	-9.16	< 2e-16	***
MAT_p^2	-1.24E-02	2.77E-03	-4.469	1.05E-05	***
DD5_s : MAT_p	2.77E-05	1.16E-05	2.38	0.017816	*

Step4: models using two climate variables for site and one for provenance.

List of the top ten models based on the proportion of variance explained (R^2).

No.	Variables	R^2	P-value	Significance
1	MAP_s, DD5_s, NFFD_p	0.4971	1.45E-50	***
2	MAP_s, DD5_s, MAT_p	0.4969	1.57E-50	***
3	MAP_s, DD5_s, DD_0_p	0.492	8.56E-50	***
4	MAP_s, DD5_s, EMT_p	0.4914	1.08E-49	***
5	MAP_s, DD5_s, Eref_p	0.4872	4.54E-49	***
6	MAP_s, DD5_s, MCMT_p	0.4863	6.32E-49	***
7	MAP_s, DD5_s, Eref_s	0.4755	2.43E-47	***
8	MAP_s, DD5_s, DD5_p	0.4738	4.33E-47	***
9	MAP_s, DD5_s, MWMT_p	0.4491	1.41E-43	***
10	MAP_s, DD5_s, Lat_p	0.4422	1.26E-42	***

Parameters of the quadratic model using the best combination of two climate variable selected for site and one for provenance.

AIC=-509.11

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
(Intercept)	-6.63E+00	1.32E+00	-5.00485	8.76E-07	***
MAP_s	-4.36E-04	1.12E-03	-0.38947	6.97E-01	
DD5_s	6.18E-04	5.73E-04	1.077843	2.82E-01	
NFFD_p	4.38E-02	7.73E-03	5.674391	2.87E-08	***
MAP_s^2	-1.68E-06	8.66E-07	-1.93529	5.37E-02	*
DD5_s^2	-1.31E-07	1.12E-07	-1.16873	2.43E-01	
NFFD_p^2	-8.27E-05	1.29E-05	-6.4255	4.17E-10	***
MAP_s:DD5_s	6.07E-07	5.40E-07	1.124564	2.62E-01	
MAP_s:NFFD_p	1.61E-06	3.32E-06	0.486831	6.27E-01	
DD5_s:NFFD_p	1.92E-06	1.31E-06	1.468427	1.43E-01	***

The model parameters after a stepwise selection to filter out non-significant terms.

AIC=-513.3

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
(Intercept)	-8.12E+00	9.92E-01	-8.19E+00	4.42E-15	***
DD5_s	7.85E-04	5.28E-05	1.49E+01	< 2e-16	***
NFFD_p	5.17E-02	7.25E-03	7.12E+00	5.62E-12	***
MAP_s^2	-6.26E-07	6.35E-08	-9.853	< 2e-16	***
NFFD_p^2	-8.31E-05	1.30E-05	-6.393	4.96E-10	***

Step5: models using three climate variables for site and one for provenance.

Top List of the top ten models based on the proportion of variance explained (R^2).

No.	Variables	R^2	P-value	Significance
1	MAP_s, DD5_s, CMD_s, MAT_p	0.5449	3.40E-55	***
2	MAP_s, DD5_s, CMD_s, NFFD_p	0.5442	4.39E-55	***
3	MAP_s, DD5_s, CMD_s, EMT_p	0.5411	1.41E-54	***
4	MAP_s, DD5_s, CMD_s, DD_0_p	0.5401	2.06E-54	***
5	MAP_s, DD5_s, CMD_s, MCMT_p	0.5346	1.63E-53	***
6	MAP_s, DD5_s, CMD_s, Eref_p	0.528	1.83E-52	***
7	MAP_s, DD5_s, CMD_s, DD5_p	0.5195	3.98E-51	***
8	MAP_s, DD5_s, CMD_s, EMT_s	0.5186	5.49E-51	***
9	MAP_s, DD5_s, CMD_s, Eref_s	0.5036	1.09E-48	***
10	MAP_s, DD5_s, CMD_s, NFFD_s	0.4908	8.71E-47	***

Parameters of the quadratic model using the best combination of three climate variables selected for site and one for provenance.

AIC=-541.21

	Estimate	Std. Error	t value	Pr(>|t|)	Significance
(Intercept)	-8.56E+00	2.32E+00	-3.692	0.000257	***
MAP_s	-2.18E-03	5.38E-03	-0.404	0.68644	
DD5_s	3.77E-03	1.42E-03	2.664	0.008072	**
CMD_s	1.82E-02	1.06E-02	1.708	0.088504	.
MAT_p	2.91E-01	8.97E-02	3.239	0.001313	**
MAP_s^2	1.78E-05	4.51E-06	3.944	9.64E-05	***
DD5_s^2	1.21E-06	3.84E-07	3.137	0.001852	**
CMD_s^2	-1.13E-05	1.03E-05	-1.094	0.274537	
MAT_p^2	-1.28E-02	2.62E-03	-4.869	1.69E-06	***
MAP_s:DD5_s	-1.05E-05	2.60E-06	-4.039	6.59E-05	***
MAP_s:CMD_s	1.42E-05	1.17E-05	1.222	0.222366	
MAP_s:MAT_p	7.95E-05	8.91E-05	0.892	0.372838	
DD5_s:CMD_s	-8.36E-06	2.78E-06	-3.003	0.002859	**
DD5_s:MAT_p	6.04E-06	2.54E-05	0.238	0.812312	
CMD_s:MAT_p	1.63E-04	1.25E-04	1.308	0.191815	