ELECTRONIC SUPPLEMENTARY MATERIAL

FOLIA GEOBOTANICA

Inter-population variability in seed dormancy, seed mass, and germination in *Helianthemum salicifolium* (Cistaceae), a hard-seeded annual herb

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Table S1. Summary of the general linear models for predicting effects of the population on the seed mass and dormancy level.

Fixed factor	Mean square	df	F	P
Seed mass				
Population	0.022	9	111.0	< 0.0001
Residuals	0.0002	40		
Dormancy level				
Population	1837.8	9	17.3	< 0.0001
Residuals	943.8	226		

Table S2. Summary of the generalized linear models for predicting effects of the population and treatment on the germination for mechanical scarification and heat shock treatments.

Fixed factor	Deviance	df	P	Fixed factor	Deviance	df	P
Mechanical scarification				*60 °C heat shock*			
Intercept	1277.3			Intercept	509.3		
Treatment	832.0	1	< 0.0001	Treatment	0.06	1	> 0.05
Population	296.2	9	< 0.0001	Population	436.7	9	< 0.0001
T x P	70.4	9	< 0.0001	T x P	4.6	9	> 0.05
80 °C heat shock				*100 °C heat shock*			
Intercept	440.9			Intercept	447.6		
Treatment	9.8	1	0.0017	Treatment	139.0	1	< 0.0001
Population	351.2	9	< 0.0001	Population	213.9	9	< 0.0001
T x P	4.4	9	> 0.05	T x P	12.6	9	> 0.05

Table S3. Mean MGT (mean germination time) in the mechanical scarification treatment and mean seed viability (mean percentage of the germinated plus non-germinated but alive seeds in the control) for each population. *Pop* is the population code as in Table 1 and *SE* is the standard error of the mean.

	MGT (days)		Seed
Pop	Mean	±SE	viability (%)
P1	6.99	1.4	100.0
P2	4.15	0.2	98.0
P3	6.16	0.6	97.1
P4	6.33	0.7	92.8
P5	5.50	0.7	100.0
P6	6.26	0.4	100.0
P7	5.21	0.3	91.4
P8	8.14	2.7	81.2
P9	3.70	0.2	100.0
P10	3.23	0.1	93.8

Table S4. Correlation matrix of the environmental variables. The values on the upper right part are Pearson correlation coefficients. The abbreviations of the variables are as in Table 1. The symbols on the lower left part show statistical significance of each pairwise comparison (^{ns} non-significant, * $p < 0.05$, ** $p < 0.01$, *** $p<0.001$, **** $p< 0.0001$).

	Alt	Lat	Long	T_{mean}	T_{max}	T_{min}	Prep
Alt		-0.18	0.87	-0.94	-0.87	-0.96	-0.75
Lat	^{ns}		0.01	-0.03	-0.17	0.07	-0.37
Long	***	^{ns}		-0.91	-0.84	-0.93	-0.81
T_{mean}	****	^{ns}	***		0.97	0.98	0.76
T_{max}	**	^{ns}	**	****		0.91	0.71
T_{min}	****	^{ns}	****	****	***		0.76
Prep	*	^{ns}	**	*	*	*	

Table S5. Correlation matrix between seed traits and environmental variables. The values are Pearson correlation coefficients. Abbreviations are as in Table 1 and Table 2. PC1 is the 'geography plus climate' variable created by principal component analysis (see Methods). MGT is the mean germination time. The symbols on the "S_{mass}" row indicates statistical significance of each pairwise comparison (* $p < 0.05$, ** $p < 0.01$; given in bold), and also critically significant ones († $0.05 < p < 0.10$). The remaining correlations are non-significant ($p > 0.05$).

	S_{mass}	Alt	Lat	Long	T_{mean}	T_{max}	T_{min}	Prep	PC1
S_{mass}	-	0.61†	-0.09	**0.77****	-0.58†	-0.45	**-0.65***	-0.57†	**0.69***
Cont	-0.39	-0.13	0.21	-0.23	0.05	-0.07	-0.13	0.00	-0.18
SC	-0.16	-0.51	0.04	-0.23	0.36	0.37	0.34	0.25	-0.38
60°C	-0.48	-0.19	0.05	-0.31	0.12	0.01	0.19	0.16	-0.22
80°C	-0.51	-0.19	0.11	-0.32	0.10	-0.04	0.19	0.20	-0.24
100°C	0.07	-0.24	0.54	-0.07	0.03	-0.10	0.11	0.00	-0.18
MGT	-0.16	0.04	0.16	-0.26	0.07	0.08	0.07	-0.01	-0.10

Table S6. Mantel *r* statistics values and their statistical significance of the associations between seed & germination traits and climate & geographic location of populations. Clim.|Geo. and Geo.|Clim. are trait correlations with climatic dissimilarity, controlling for geographic distance and with geographical distance, controlling for climatic dissimilarity, respectively. Significant values ($p < 0.05$) marked with an asterisk; all remaining values are non-significant ($p > 0.05$).

	Clim.|Geo.	Geo.|Clim.
Smass	-0.05	0.32 *
Dorm	-0.19	0.10
SC	0.31 *	-0.32
60° C	0.04	-0.05
80° C	-0.01	-0.16
100° C	-0.26	0.20

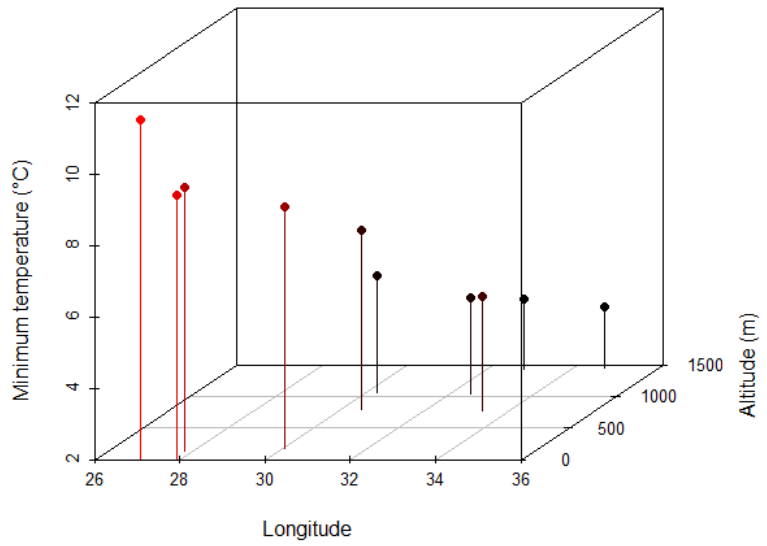

Fig S1. The relationship among minimum annual temperature (T_{min}), longitude and altitude of the places where seeds of different populations were collected. Each point represents a population. T_{min} included here since it was the best predictor of seed mass among other climatic variables.

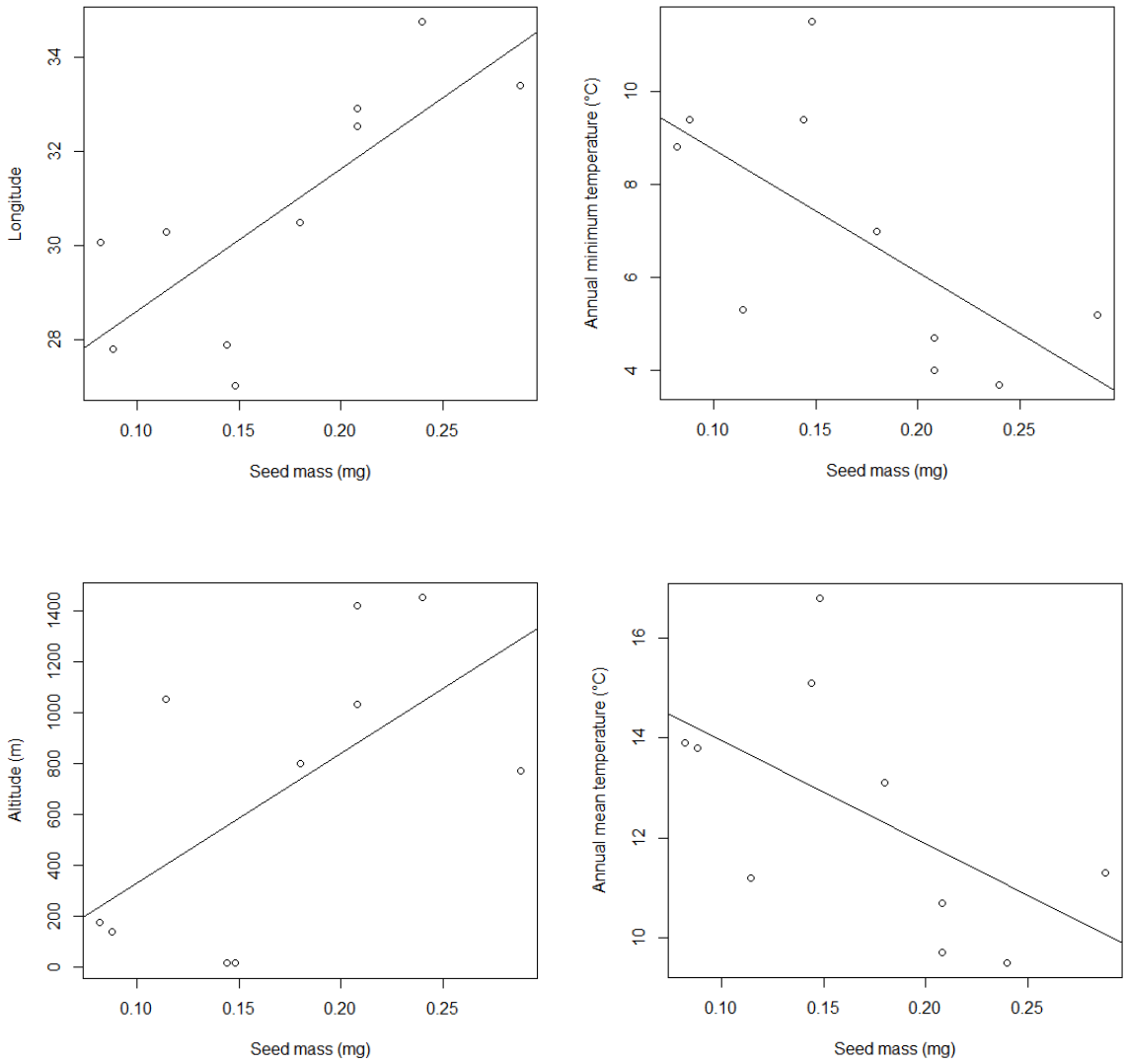

Fig. S2. The relationship between seed mass and longitude, altitude, T_{min} (annual minimum temperature) and T_{mean} (annual mean temperature). Each point represents a population.