

SUPPORTING INFORMATION FOR:

**SIGNS OF LOCAL ADAPTATION AND PHENOTYPIC PLASTIC RESPONSE TO
ELEVATION SHIFTED BETWEEN ENVIRONMENTAL BACKGROUNDS IN
SNAPDRAGON PLANTS**

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1 SUPPLEMENTARY MATERIAL

1.1 *Supplementary Informations*

ENVIRONMENTAL CONDITIONS IN PLANTING SITES — Temperature (°C), Relative Humidity (%) and Light intensity (lux) were measured during the experiment at each garden site and environment using external data loggers (HOBO U12-012) with one measure per hour. Photosynthetically Active Radiation (PAR) and spectral data were measured at each planting site and environment in cloud-free conditions, to minimize the external effects of the atmospheric conditions, using a fiber-optic spectrometer (AvaSpec-2048; Avantes, Netherlands). The sensor's field of view was 25°, with a full sky irradiance remote cosine corrector. Spectral data was measured at wavelengths ranging from 400 nm to 1000 nm at 0.6 nm intervals and flux densities of PAR were measured at 60 s intervals every 15 days from 10 am to 2 pm during the experiment. The mean of each type of these light measurement were obtained for each site and environment. The red:far-red (R/FR) ratio was calculated from the spectral data (photon flux between 655 and 665 nm divided by photon flux between 725 and 735 nm).

Meteorological variables and light availability were compared between planting sites, in different environment, using linear mixed-effects models. Daily average of Temperature, Relative Humidity and Light intensity were compared with planting site as a fixed effect and days as a random effect. A difference between sites for PAR and spectral data averages were determined with planting sites as a fixed effect and hours or wavelengths as a random effect.

1.2 *Supplementary Table*TABLE S1: Description of *Anthirinum majus* populations grown in the two common garden experiments. Nfam= number of families, N= number of plants.

Acronym	Latitude	Longitude	Location	Altitude.(m)	Subspecies	Description	Origin	Nfam	Nseed
BAG	43.10	2.98	Bages	6	pseudomajus	Dunes on seaside (rocky / herbaceous)	Low	15	180
BAN	42.49	3.12	Banyuls-sur-Mer	61	pseudomajus	Rockside bank (rocky)	Low	15	180
BES	42.21	2.67	Besalú	195	pseudomajus	Stone walls in village	Low	15	180
CAL	42.10	1.83	Berga	838	pseudomajus	Roadside bank (herbaceous)	High	15	180
LAG	43.09	2.58	Lagrasse	149	pseudomajus	Roadside bank (rocky / herbaceous)	Low	15	180
LUC	42.97	2.26	Luc-sur-Aude	227	striatum	Roadside bank and river-side bank (rocky)	Low	15	180
LYS	42.83	2.20	'Pierre-Lys' gorge	713	striatum	Roadside bank (rocky / herbaceous)	Low	15	180
MAR	42.55	2.62	Saint-Marsal	628	striatum	Roadside bank (rocky / herbaceous)	Low	15	180
MIJ	42.73	2.04	Mijanès	1347	striatum	Roadside bank (herbaceous)	High	13	156
MON	42.51	2.12	Mont-Louis citadelle	1564	striatum	Stone walls on fortifications	High	15	180
PAR	42.31	2.20	Pardines	1118	pseudomajus	Roadside bank (herbaceous)	High	15	180
RIP	42.21	2.20	Ripoll	709	pseudomajus	Roadside bank (herbaceous)	Low	15	180
SAL	42.23	1.74	Saldes	1126	pseudomajus	Banks in pasture (herbaceous)	High	15	180
THU	42.64	2.72	Thuir	130	striatum	Roadside bank (herbaceous)	Low	15	180
VIL	42.59	2.48	Villefranche-de-Conflent	568	striatum	Bank (rocky and shrubs)	Low	15	180

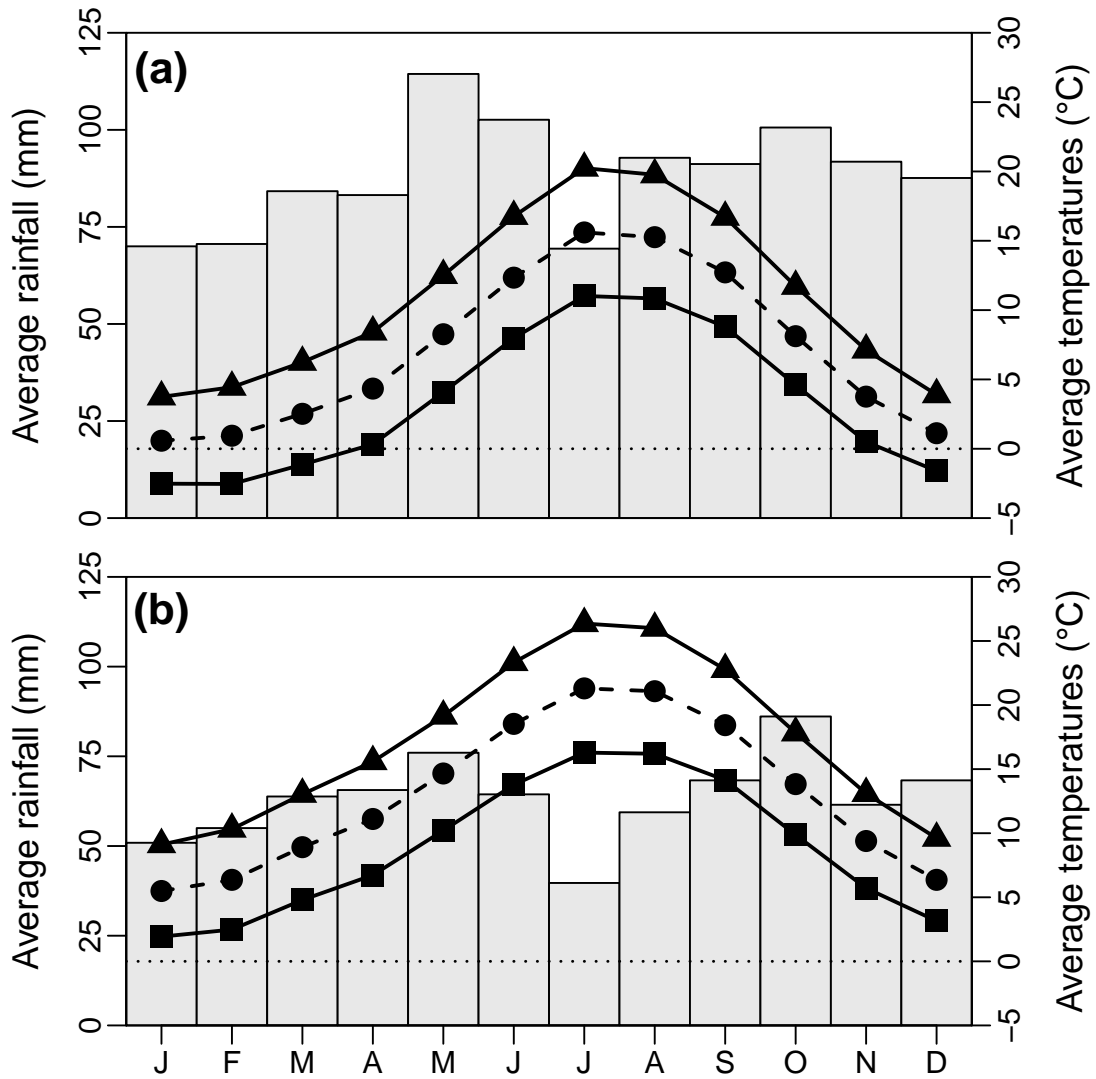
1.3 *Supplementary Figures*

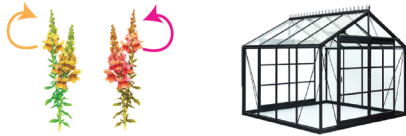
FIGURE S1: Environmental conditions recorded monthly over a year at a) high-elevation and b) low-elevation sites. Histograms represent average rainfall, and lines average (dot points), minimum (square) and maximum (triangle) temperatures

SUPPORTING INFORMATION FOR:



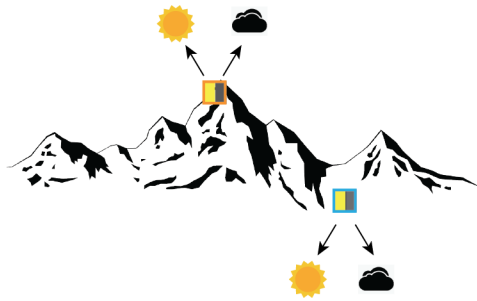
1. Seed collection:

Seeds of *A. m. pseudomajus* and *A. m. striatum* collected from high- and low-elevation populations in the Pyrennes



2. Seed production under control conditions:

two generations of plants were generated via controlled-crosses to reduce maternal effects



3. Seeds transplantation in four common gardens:

at two elevation sites (high vs low) and under two light treatments (light and shade)

FIGURE S2: Schema of the experimental design.

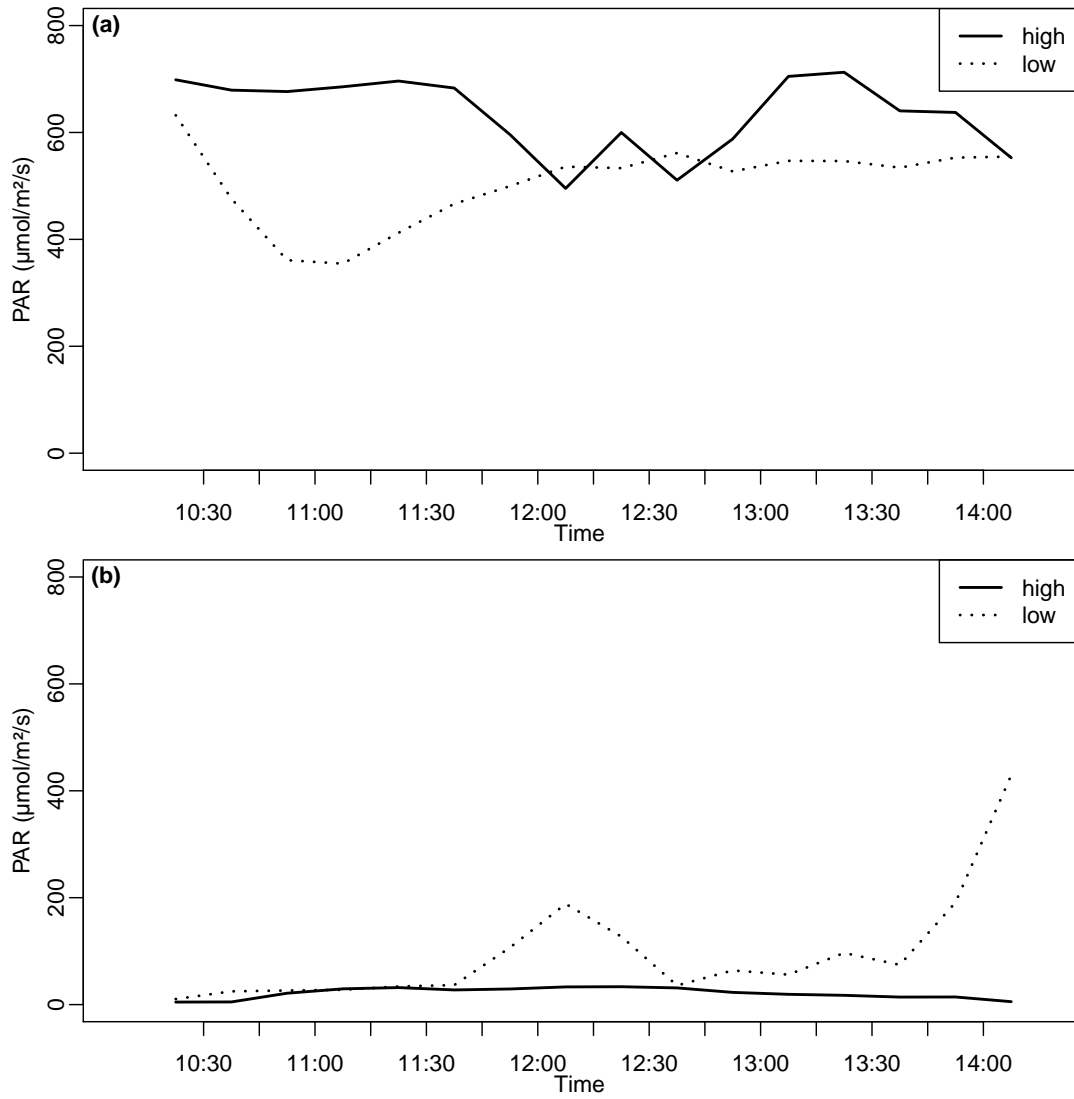


FIGURE S3: Difference in photosynthetically active radiation (PAR) between high and low-elevation sites in a) open habitat light, and b) understory shade treatments.

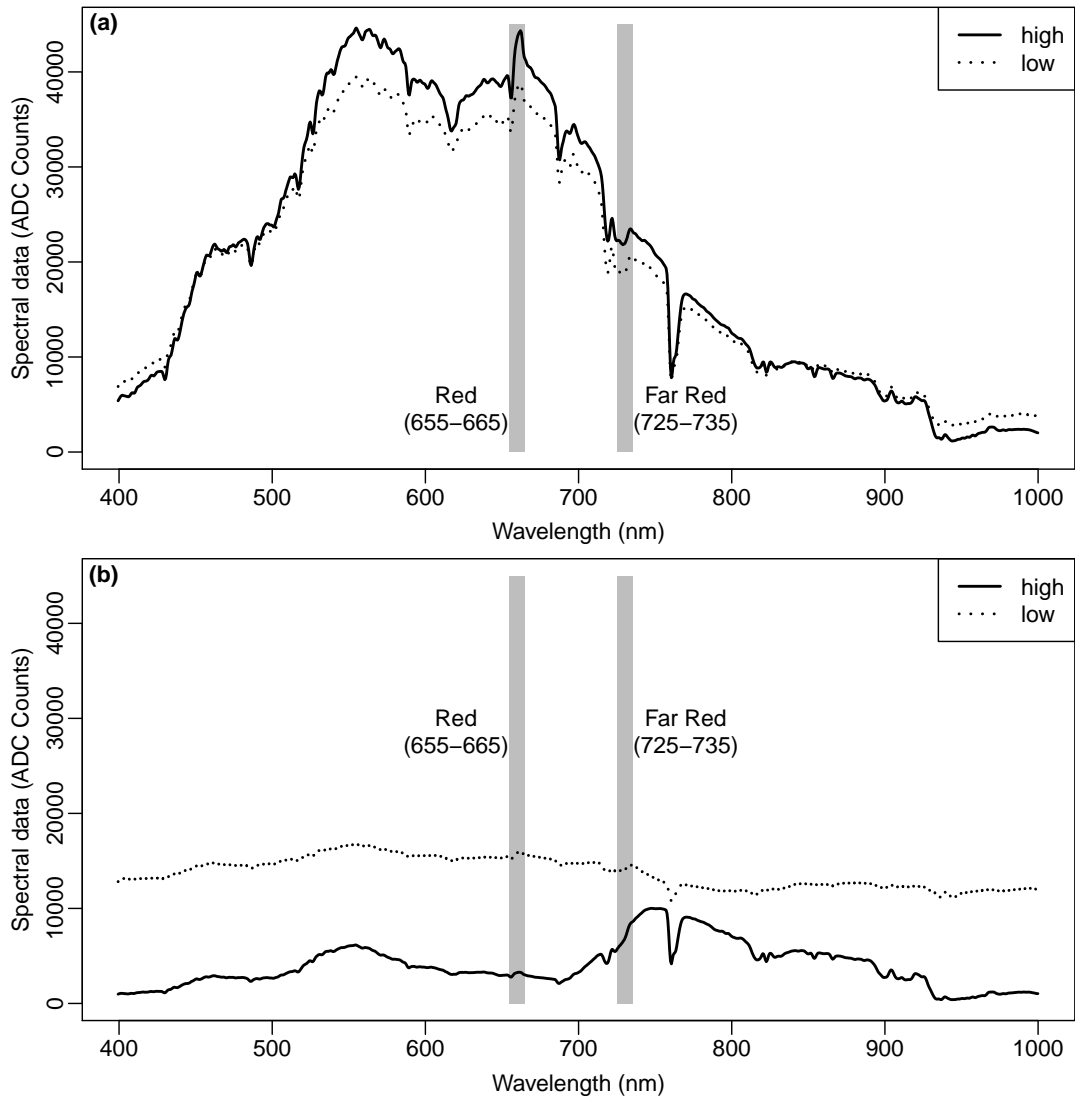


FIGURE S4: Differences in spectral data between high and low-elevation sites in a) open habitat light, and b) understory shade treatments.

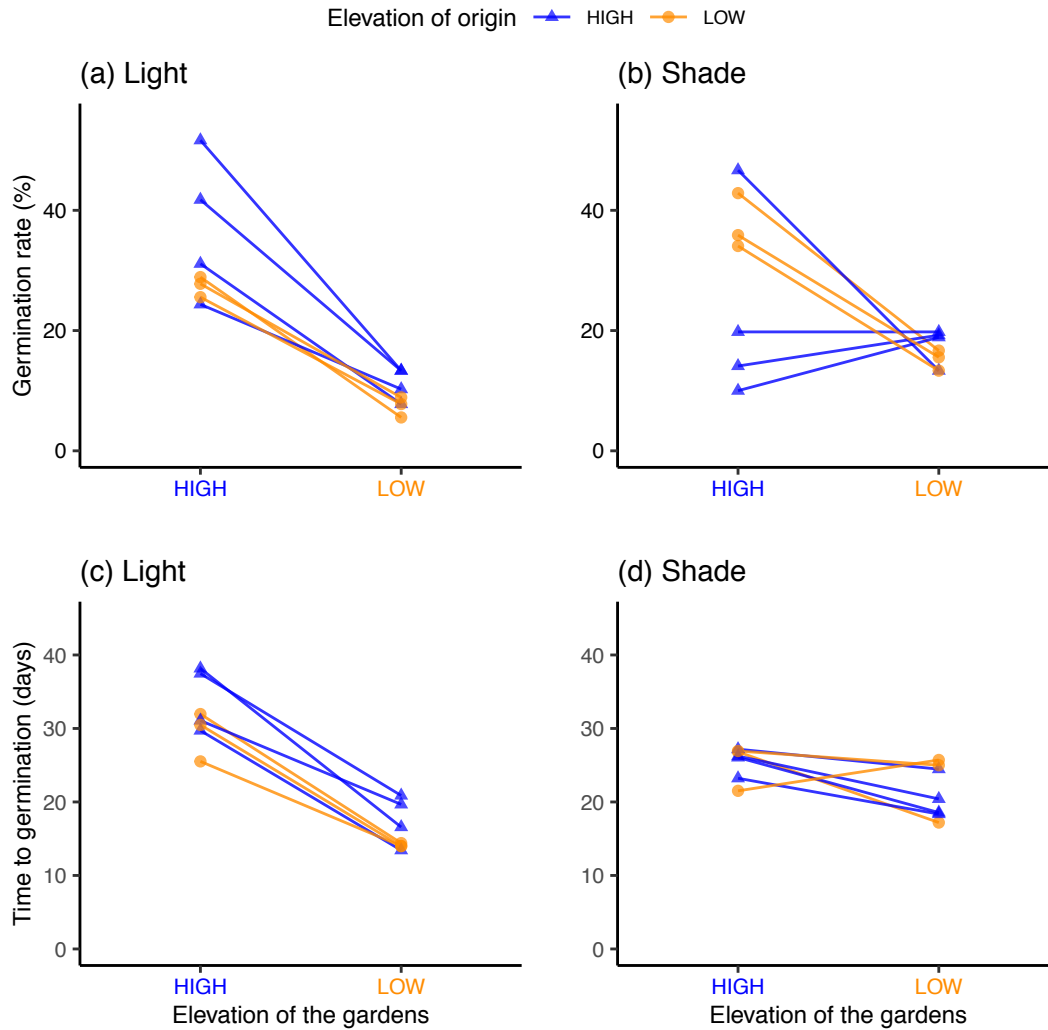


FIGURE S5: Reaction norms of germination-related traits (mean values \pm 95% CI) for seven populations of *Anthirrinum majus striatum* in the two sites (low and high elevations) and under two treatments (open light habitat and undertory shade). plots a) and b) refer to germination rate, c) and d) to time to germination, a) and c) refer to light treatment, b) and d) to shade treatment. Significant differences are indicated by asterisks. ***: p .value \leq 0.001, **: $0.001 < p$.value \leq 0.01, *: $0.01 < p$.value \leq 0.05, ".": $0.05 < p$.value $<$ 0.1, ns"ns": p .value \geq 0.1.

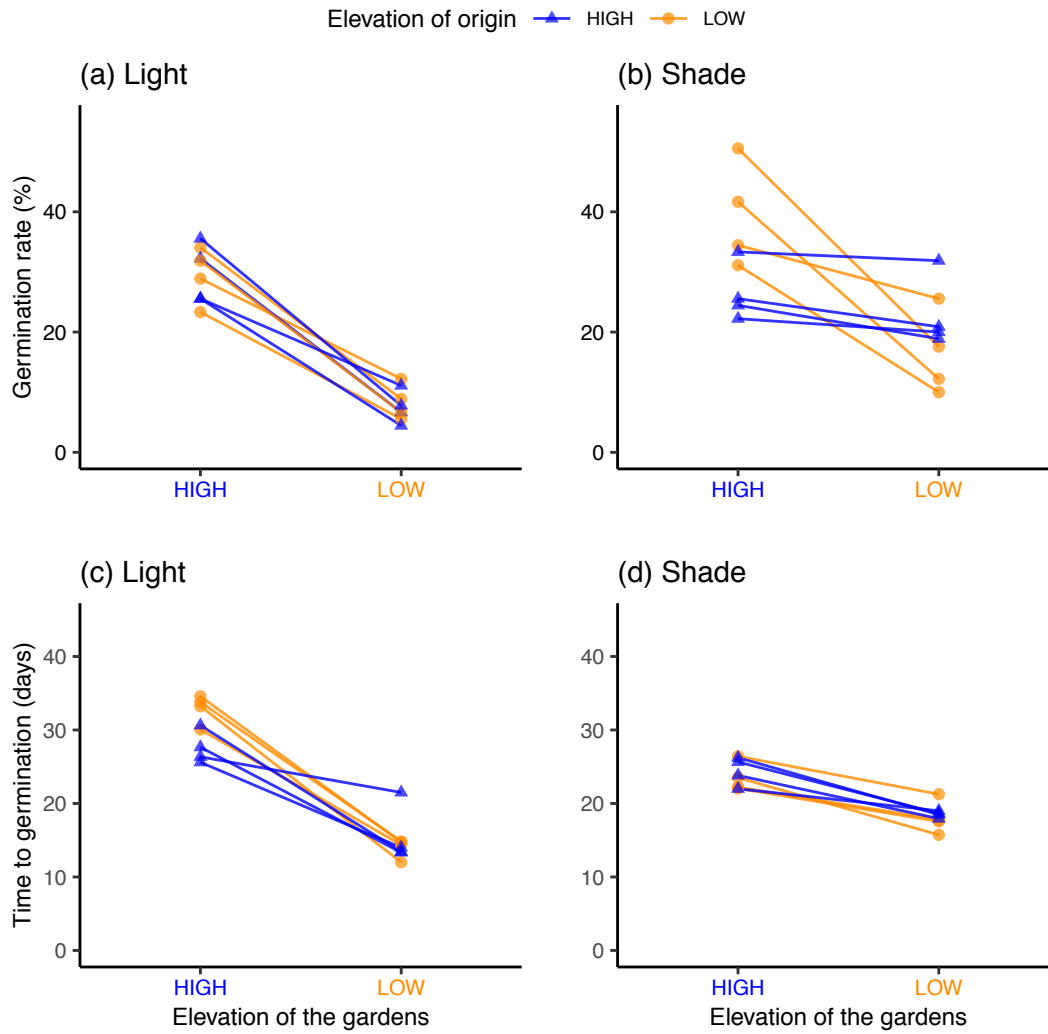


FIGURE S6: Reaction norms of germination-related traits for eight populations of *Anthirrinum majus pseudomajus* in the two sites (low and high elevations) and under two treatments (open light habitat and undertory shade). plots a) and b) refer to germination rate, c) and d) to time to germination, a) and c) refer to light treatment, b) and d) to shade treatment. Significant differences are indicated by asterisks. ***: $p.value \leq 0.001$, **: $0.001 < p.value \leq 0.01$, *: $0.01 < p.value \leq 0.05$, ".": $0.05 < p.value < 0.1$, "ns": $p.value \geq 0.1$.