SUPPLEMENT FOR CHAPTER 3

Table 3.S1: Sample sizes for the manipulative common garden experiment evaluating responses to grasshopper herbivory and water availability over three years. In this mid-elevation common garden (2890 m above sea level), we manipulated exposure to herbivores and water throughout the growing season for accessions of *Boechera stricta* sourced from natural populations along an elevational gradient. We monitored plants for fitness (probability of reproduction and fecundity), reproductive phenology, leaf succulence, specific leaf area, and damage by herbivores. We transplanted 5 – 51 full siblings per maternal family into all four treatment levels (N=36 maternal families, with one family sampled per source population from each of 36 source populations, covering a range of elevations from 2519 – 3673 m).

	Grasshopper Addition		
Watering Treatment	Individuals planted	Individuals survived until the end of the experiment	Individuals reproduced (across all years)
Restricted	164	72	24
Supplemental	166	59	20
	Grasshopper Removal		
	Individuals planted	Individuals survived until the end of the experiment	Individuals reproduced (across all years)
Restricted	166	88	22
Supplemental	162	72	35

Table 3.S1b: Source latitude, longitude, elevation, and sample size information for each of the 36 maternal families and accessions used in the experiment.

					Watering availability	Plants in Grasshopper Addition by		Plants in Grasshopper Removal by	
Accession	Family	Latitude	Longitude	Elevation (m)		Restricted	Supplemental	Supplemental	Restricted
265_4C	265	38.7081	-106.803	2519.4768		6	5	4	4
270_26C	270	38.72567	-106.873	2553		7	5	3	5
214_7A	214	38.88028	-106.998	2693.59		6	7	4	3
273_18C	273	38.88508	-106.997	2710		2	2	1	3
262_5B	262	38.87918	-106.999	2717.292		3	4	7	6
209_5A	209	38.87026	-106.952	2721.21		6	6	4	4
323_4	323	38.90334	-107.013	2734		7	5	3	4
272_10	272	38.71678	-106.873	2752		0	2	0	0
257_2	257	38.87382	-106.91	2754.1728		3	3	6	6
213_1A	213	38.88305	-106.96	2789.81		3	3	1	1
269_20	269	38.91977	-107.035	2800		3	6	8	4
86_2C	86	38.95548	-106.988	2880		4	6	6	4
283_11A	283	38.95143	-106.991	2890		5	4	5	6
67_3C	67	38.96043	-106.992	2903		3	3	3	3
49_2A	49	38.9842	-107.004	2935		6	7	4	3
01_4	1	38.98123	-106.998	2989		6	6	4	4
81_1	81	38.95532	-106.972	3095		6	3	4	7
194_2	194	38.9906	-107.02	3108		5	1	5	8
211_3B	211	39.03781	-107.063	3121.58		10	10	20	11
250_16A	250	39.0391	-107.064	3133		4	8	6	2
207_5A	207	39.01892	-107.049	3218.6		5	5	5	5
189_26	189	38.99412	-107.03	3273		5	3	3	6
255_7A	255	39.03158	-107.078	3341.67		0	1	0	3
297B_7F	297B	39.03189	-107.081	3405.95		6	2	4	8
185_2	185	39.01138	-107.034	3411		4	2	2	4
300_1B	300	39.02889	-107.085	3443		3	5	7	5
252_1	252	39.027	-107.067	3444		2	4	6	4
200_1	200	38.99812	-106.981	3447		0	1	0	1
253_9E	253	38.99198	-107.066	3460		8	8	11	11
301_2A	301	39.02778	-107.087	3494		7	4	3	6
199_2	199	39.00687	-106.945	3502		5	4	5	6
302_15E	302	39.02667	-107.087	3511		4	6	7	4
303_8	303	39.02444	-107.088	3570		5	8	4	2
198_1	198	39.01292	-106.946	3623		2	4	3	2
328_2	328	38.98283	-107.046	3660		7	6	3	4
304_11F	304	39.02111	-107.093	3673		8	3	3	7

Table 3.S2: The grasshopper manipulation schedule for the main experiment. In this experiment, we manipulated grasshopper abundance and water availability within large cages in a common garden experiment (see Fig. S2 for a diagram of the experimental design). In grasshopper removal cages, we captured grasshoppers via sweep netting 1-3 times per week and released them in the addition cages. Any other insects that were inadvertently captured during the sweep netting were released outside of the cages. We specifically targeted grasshoppers and sought to maintain the abundance of other herbivores at ambient levels.

First year of the study (2021): A total of 93 grasshoppers were removed from the three removal cages across 5 weeks and a total of 500 grasshoppers were added to the three addition cages across the same timespan during the growing season. During the height of the season, we conducted sweep netting once a week for five weeks. On each date, we used a sweep net within each cage for 5-20 minutes, depending on the abundance of grasshoppers. We removed all grasshoppers from the three removal cages and placed them into addition cages. We also sampled outside of the cages for 20-45 minutes and added all captured grasshoppers to the addition cages. Finally, on three dates, we did additional 2 minute collections within all cages and in an equal sized area outside of the cages to quantify the density of grasshoppers. We found that our grasshopper addition nearly doubled (1.86) the number of grasshoppers in the surrounding meadow, whereas our removal protocol nearly eliminated grasshoppers.

Date	Treatment	Average number of grasshoppers removed per cage	Average number of grasshoppers added from the removal cages to the addition cages	Duration of sampling within the cages	Average number of grasshoppers added to each cage from sampling outside of the cages	Total time sampling outside of the cages	Total grasshoppers collected outside of cages	Average grasshoppers captured in 2 minute search within each cage	Average grasshoppers captured in 2 minute search outside of the cages	Notes
6/22/2021	Removal	4	0	5 minutes	0	NA	NA	NA		
6/22/2021	Addition	0	4	5 minutes	23.33	30	70	NA	NA	
6/28/2021	Removal	0	0	Not recorded	0	NA	NA	0		3 searches of 2 minutes each outside of cages
6/28/2021	Addition	0	0	Not recorded	11.67	20	35	21.33	12.67	
07/01/2021	Removal	0	0	Not recorded	0	NA	NA	NA		
07/01/2021	Addition	0	0	Not recorded	62.33	30	187		NA	
07/06/2021	Removal	11.67	0	10 minutes	0	NA	NA	1.33		4 searches of 2 minutes each outside of cages
07/06/2021	Addition	0	11.67	10 minutes	45	45	135	69.33	35.75	
07/19/2021	Removal	15.33	0	10-20 minutes	0	NA	NA	3.33		4 searches of 2 minutes each outside of cages
07/19/2021	Addition	0	15.33	10-20 minutes	37	30-45 minutes	111	59.67	32.25	

Second year of the study (2022): Grasshopper abundance was lower in 2022 than in 2021: A total of 14 grasshoppers were removed from the three removal cages across 5 weeks and a total of 64 grasshoppers were added to the three addition cages once per week for five weeks. Sampling in 2022 differed from 2021 in several ways. On each date, we used a sweep net within removal cages for 4-12 minutes, removing all grasshoppers captured. We also sampled outside of the cages for 10-18 minutes to quantify grasshopper abundance and collect grasshoppers for the addition cages.

Date	Treatment	Average number of grasshoppers removed per cage	Average number of grasshoppers placed in each addition cages	Average duration of sampling within cages	Total time sampling outside of the cages	Total grasshoppers collected outside of cages
6/22/2022	Removal	1.33	0	4.5 minutes	NA	NA
6/22/2022	Addition	0	0	NA	18	9
6/29/2022	Removal	1.67	0	4.5 minutes	NA	NA
6/29/2022	Addition	0	0	NA	12	6
7/7/2022	Removal	0.056	0	4.5 minutes	NA	NA
7/7/2022	Addition	0	5	NA	12	9
7/14/2022	Removal	0.67	0	12 minutes	NA	NA
7/14/2022	Addition	0	9	NA	10	3
7/21/2022	Removal	0.67	0	4 minutes	NA	NA
7/21/2022	Addition	0	7.33	NA	18	13

Third year of the study (2023): In the final year of the study, we manipulated grasshopper abundance 2-3 times per week over a 6 week period. In total, we removed > 615 grasshoppers from the removal cages in 10 minute sweep netting sampling periods. We added 615 to the addition cages. We did not perform additional sweep netting outside of the cages.

Date	grasshoppers removed from Removal treatment	Average number of grasshoppers added to each addition cage	time sampled
6/15/23	2-3 per cage	2-3	10 minutes
6/20/23	2-3 per cage	2-3	10 minutes
6/29/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/3/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/7/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/10/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/12/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/17/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/19/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/21/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/24/23	Not recorded, but all grasshoppers were removed	20	10 minutes
7/26/23	Not recorded, but all grasshoppers were removed	20	10 minutes

Table 3.S3: Volumetric water content in the common garden experiment: We analyzed volumetric water content as a function of watering and herbivore treatment and year using a generalized linear model with a gamma distribution with a log link (function glmmTMB, R package *glmmTMB* ver. 1.1.4, Brooks et al., 2017). We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car* ver. 3.0-12, Fox & Weisburg, 2019). Significant effects are in bold typeface.

	χ^2	DF	p-value
Water availability	9.36	1	0.002218
Grasshopper treatment	0.21	1	0.64
Year	326.94	2	<0.0001
Water availability × Grasshopper treatment	0.15	1	0.70
Water availability × Year	9.17	2	0.0102
Grasshopper treatment × Year	0.20	2	0.90
Water availability × Grasshopper treatment × Year	4.42	2	0.11
Random Effects	49.52	1	<0.0001
Block nested within cage	75.60	1	<0.0001

Table 3.S4: Regression analysis to estimate the day of first flowering for the subset of plants that flowered between censuses. We recorded the phenology of each plant 2-3 times a week, including the number of flowers, the number of fruits (=siliques) and the length of the longest fruit. Of the 117 plants that flowered during this experiment, 34 individuals produced their first flower between censuses. We calculated the date of first flowering for those individuals based on the average rate of fruit elongation across censuses. To make this calculation, we analyzed data from N=60 plants for which we have data on the exact ordinal day of first flowering, when they had new open unfertilized flowers and no developing fruits. For those individuals, we regressed the number of elapsed days between the day of first flowering and the next census on the length of the first fruit at this census immediately after flowering. We used an intercept free model to model elapsed days as a function of fruit length. This represents a simplified version of what we have done before (e.g., Wadgymar et al., 2017).

Type 3 tests of fixed effects.

Effect	$F_{1,54}$	p-value	parameter estimate	SE	R^2
Length of the longest fruit (silique) on the first census after flowering	196.89	<0.0001	2.5901 mm fruit growth / day	0.18	0.78

We then used the parameter estimate to calculate the timing of first flowering of plants that flowered between censuses by dividing the length of the first fruit on the first day at which we recorded a plant as reproductive by the rate of fruit elongation (2.5901 mm fruit growth / day) to calculate the number of days that had elapsed between flowering and fruiting.

Calculated days = Length of the longest fruit (silique) on the first census recorded as reproductive / 2.5901

We then calculated the day of first flowering by subtracting the calculated day from the ordinal day of year of the census on which a plant was recorded as fruiting

Code	Description
DFF	Calculated day of first flowering
OD	Ordinal day of year when a flower was first recorded on a plant (census when flowering was first noted)

DFF = OD - Elapsed days

This calculation would not affect plants for which we captured the true day of first flowering, as they had 0 fruits (0 fruit length) on that census.

Table 3.S5: Sample sizes for the manipulative common garden experiment evaluating responses to native herbivores. In the mid-elevation common garden (2890 m above sea level) and high-elevation common garden (3133 m above sea level), we manipulated herbivory throughout the growing season for accessions of *Boechera stricta* sourced from natural populations along an elevational gradient. We monitored plants for fitness (probability of reproduction and fecundity) and damage by herbivores.

Garden elevation (m)	Cohort	Insecticide treatment			Water treatment		
		Individuals planted	Individuals survived until the end of the experiment	Individuals reproduced (across all years)	Individuals planted	Individuals survived until the end of the experiment	Individuals reproduced (across all years)
2890	2020	156	12	12	163	7	15
	2021	271	31	33	255	21	41
	2022	359	43	21	355	23	21
3133	2020	210	63	18	202	80	28
	2022	327	277	26	349	272	15

Table 3.S5b: Source latitude, longitude, elevation, and sample size information for each of the 39 maternal families and accessions used in the field experiment manipulating herbivory.

					Garden: 2890 m					
				Cohort	2020		2021		2022	
Accession	Family	Latitude	Longitude	Elevation (m)	Insecticide	Water	Insecticide	Water	Insecticide	Water
267_13A	267	38.7095319	-106.8015267	2498.61	3	4	0	0	0	0
267_3A	267	38.7095319	-106.8015267	2498.61	0	0	3	2	0	0
267_7B	267	38.7095319	-106.8015267	2498.61	0	0	0	0	9	9
265_3B	265	38.7081	-106.80285	2519.4768	0	0	0	0	14	14
270_10A	270	38.7256667	-106.8727	2553	0	0	0	0	0	0
270_3	270	38.7256667	-106.8727	2553	4	5	9	7	8	10
268_1C	268	38.7249167	-106.8142167	2668	0	0	0	0	2	2
268_52	268	38.7249167	-106.8142167	2668	0	0	8	6	0	0
214_7A	214	38.8802844	-106.9977825	2693.59	0	0	0	0	13	11
273_18	273	38.885075	-106.9972361	2710	3	5	2	3	5	3
209_5A	209	38.8702642	-106.9519711	2721.21	4	3	12	10	8	8
256_1	256	38.8664167	-106.9127667	2734.6656	4	4	6	7	0	0
256_3C	256	38.8664167	-106.9127667	2734.6656	0	0	0	0	10	10
258_10	258	38.8786	-106.9094	2765.7552	3	1	0	0	5	5
269_20	269	38.9197667	-107.0348	2800	6	6	5	6	15	15
86_2C	86	38.9554833	-106.9884667	2880	3	3	10	9	0	0
283_11A	283	38.9514333	-106.991075	2890	5	4	7	7	20	20
68_1	68	38.9609	-106.9926833	2904	4	3	9	8	13	12
91_2	91	38.9535167	-106.9924167	2910	4	6	9	8	5	5
50_4A	50	38.9795	-107.0005	2934	10	9	15	14	10	10
66_3A	66	38.9796333	-107.00405	2940	4	4	7	6	10	10
63_8	63	38.9880833	-107.0079667	2960	7	8	6	5	14	14
60_4	60	38.9879833	-107.0120167	2977	6	8	13	12	19	19
154_1	154	38.9942333	-107.0146833	2992	8	7	6	6	0	0
98_7	98	38.9668333	-106.9896667	3011	4	4	12	11	13	12
162_2B	162	39.0003667	-107.0231	3055	15	15	11	10	17	16
194_2	194	38.9906	-107.0196667	3108	4	4	19	19	0	0
250_16	250	39.0391	-107.0636333	3133	3	5	13	13	10	10
170_2	170	39.0054833	-107.0344833	3168	10	10	10	10	0	0
207_5A	207	39.0189236	-107.0494972	3218.6	4	5	11	11	15	15
180_5	180	39.0038333	-107.0072167	3249	6	8	10	10	17	17
174_2	174	39.0141833	-107.0454167	3252	8	7	11	10	8	7
255_7A	255	39.0315806	-107.0784611	3341.67	0	0	0	0	15	14
201_1	201	38.9699167	-107.0267333	3352	5	4	0	0	0	0
201_2	201	38.9699167	-107.0267333	3352	0	0	5	4	15	15
327_2	327	38.9754833	-107.0332333	3389	0	0	0	0	5	5
297B_7I	297B	39.03189	-107.0811	3405.95	0	0	0	0	5	5
185_2	185	39.0113833	-107.03395	3411	3	4	10	9	18	19
252_1	252	39.027	-107.0669457	3444	3	3	0	0	8	8
301_8D	301	39.0277778	-107.0866667	3494	0	0	0	0	9	10
199_1	199	39.0068667	-106.9452	3502	1	3	0	0	0	0
199_2	199	39.0068667	-106.9452	3502	0	0	9	9	0	0
302_19E	302	39.0266667	-107.0869444	3511	8	7	9	8	12	12
305_19D	305	39.0211111	-107.0883333	3604	0	0	0	0	7	8
198_1	198	39.0129167	-106.94635	3623	0	0	7	8	0	0
304_19	304	39.0211111	-107.0933333	3673	4	4	7	7	0	0
304_23	304	39.0211111	-107.0933333	3673	0	0	0	0	5	5

					Garden: 3133 m			
				Cohort	2020		2022	
Accession	Family	Latitude	Longitude	Elevation (m)	Insecticide	Water	Insecticide	Water
267_13A	267	38.7095319	-106.8015267	2498.61	5	5	0	0
267_3A	267	38.7095319	-106.8015267	2498.61	0	0	0	0
267_7B	267	38.7095319	-106.8015267	2498.61	0	0	9	10
265_3B	265	38.7081	-106.80285	2519.4768	0	0	16	19
270_10A	270	38.7256667	-106.8727	2553	0	0	8	9
270_3	270	38.7256667	-106.8727	2553	7	7	0	0
268_1C	268	38.7249167	-106.8142167	2668	0	0	0	0
268_52	268	38.7249167	-106.8142167	2668	0	0	0	0
214_7A	214	38.8802844	-106.9977825	2693.59	0	0	14	11
273_18	273	38.885075	-106.9972361	2710	5	5	5	2
209_5A	209	38.8702642	-106.9519711	2721.21	5	5	15	18
256_1	256	38.8664167	-106.9127667	2734.6656	5	5	0	0
256_3C	256	38.8664167	-106.9127667	2734.6656	0	0	7	7
258_10	258	38.8786	-106.9094	2765.7552	5	5	0	0
269_20	269	38.9197667	-107.0348	2800	8	8	12	12
86_2C	86	38.9554833	-106.9884667	2880	5	5	0	0
283_11A	283	38.9514333	-106.991075	2890	5	5	19	20
68_1	68	38.9609	-106.9926833	2904	6	5	12	12
91_2	91	38.9535167	-106.9924167	2910	8	7	5	4
50_4A	50	38.9795	-107.0005	2934	11	10	6	8
66_3A	66	38.9796333	-107.00405	2940	7	7	6	6
63_8	63	38.9880833	-107.0079667	2960	9	9	12	11
60_4	60	38.9879833	-107.0120167	2977	7	9	12	15
154_1	154	38.9942333	-107.0146833	2992	10	9	0	0
98_7	98	38.9668333	-106.9896667	3011	5	5	8	8
162_2B	162	39.0003667	-107.0231	3055	17	14	13	14
194_2	194	38.9906	-107.0196667	3108	5	5	0	0
250_16	250	39.0391	-107.0636333	3133	5	5	11	11
170_2	170	39.0054833	-107.0344833	3168	10	10	0	0
207_5A	207	39.0189236	-107.0494972	3218.6	5	5	15	15
180_5	180	39.0038333	-107.0072167	3249	10	9	16	16
174_2	174	39.0141833	-107.0454167	3252	10	10	9	13
255_7A	255	39.0315806	-107.0784611	3341.67	0	0	13	15
201_1	201	38.9699167	-107.0267333	3352	6	5	0	0
201_2	201	38.9699167	-107.0267333	3352	0	0	7	10
327_2	327	38.9754833	-107.0332333	3389	0	0	12	13
297B_7I	297B	39.03189	-107.0811	3405.95	0	0	3	5
185_2	185	39.0113833	-107.03395	3411	5	5	18	19
252_1	252	39.027	-107.0669457	3444	5	5	3	3
301_8D	301	39.0277778	-107.0866667	3494	0	0	7	7
199_1	199	39.0068667	-106.9452	3502	4	4	0	0
199_2	199	39.0068667	-106.9452	3502	0	0	0	0
302_19E	302	39.0266667	-107.0869444	3511	9	8	18	18
305_19D	305	39.0211111	-107.0883333	3604	0	0	8	12
198_1	198	39.0129167	-106.94635	3623	0	0	0	0
304_19	304	39.0211111	-107.0933333	3673	6	6	0	0
304_23	304	39.0211111	-107.0933333	3673	0	0	8	6

Table 3.S6: Odds ratio for the effect of source elevation on foliar damage by insects under each treatment combination for each year. We collected data on herbivory for every plant for 2-3 censuses per growing season across three years. Significant odds ratios are in bold typeface. We analyzed herbivory as a function of source elevation, watering and herbivore treatment and year using a generalized linear model with a beta distribution with a logit link (function gamlss, R package *gamlss* ver. 5.4-20, Rigby & Stasinopoulos). Odds ratios <1 indicate that herbivory declined with source elevation and odds ratios >1 indicate that herbivore increased with source elevation (as predicted). Regression relationships are shown in Fig. 2A.

Grasshopper treatment	Water availability	Year	Odds ratio	95% CI, lower	95% CI, upper
Addition	Restricted	2021	0.88	0.803	0.95
Addition	Supplemental	2021	0.999	0.884	1.127
Removal	Restricted	2021	0.948	0.842	1.068
Removal	Supplemental	2021	0.957	0.847	1.081
Addition	Restricted	2022	1.609	1.41	1.837
Addition	Supplemental	2022	1.457	1.27	1.673
Removal	Restricted	2022	1.249	1.101	1.416
Removal	Supplemental	2022	1.23	1.08	1.401
Addition	Restricted	2023	1.872	1.601	2.19
Addition	Supplemental	2023	1.643	1.342	2.01
Removal	Restricted	2023	1.351	1.159	1.573
Removal	Supplemental	2023	1.295	1.088	1.54

Table S6b: Mean foliar damage for each Grasshopper treatment and water availability treatment combination for each year (see Fig. 2B).

Grasshopper treatment	Water availability	Year	Mean leaf area removed by herbivores (proportion)	95% CI, lower	95% CI, upper
Addition	Restricted	2021	0.036	0.033	0.039
Addition	Supplemental	2021	0.025	0.023	0.027
Removal	Restricted	2021	0.019	0.017	0.021
Removal	Supplemental	2021	0.017	0.016	0.019
Addition	Restricted	2022	0.054	0.049	0.06
Addition	Supplemental	2022	0.048	0.043	0.053
Removal	Restricted	2022	0.028	0.026	0.031
Removal	Supplemental	2022	0.026	0.023	0.028
Addition	Restricted	2023	0.062	0.054	0.07
Addition	Supplemental	2023	0.035	0.029	0.041
Removal	Restricted	2023	0.032	0.028	0.037
Removal	Supplemental	2023	0.033	0.028	0.037

Table 3.S7: Analysis of plasticity and clines of specific leaf area in response to water availability, Grasshopper treatment: We analyzed specific leaf area as a function of source elevation, watering and herbivore treatment and year using a generalized linear model with a log normal distribution with a log link (function glmmTMB, R package *glmmTMB* ver. 1.1.4, Brooks et al., 2017). We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car* ver. 3.0-12, Fox & Weisburg, 2019). Significant effects are in bold typeface.

	χ^2	DF	p-value
Source elevation	12.39	1	0.00043
Water availability	14.19	1	0.000165
Grasshopper treatment	1.34	1	0.25
Year	1.56	1	0.21
Source elevation × Water availability	3.5	1	0.06
Source elevation × Grasshopper treatment	0.07	1	0.78
Source elevation × Year	9.71	1	0.00183
Water availability × Grasshopper treatment	2.14	1	0.14
Water availability × Year	0.19	1	0.67
Grasshopper treatment × Year	0.61	1	0.44
Source elevation × Water availability × Grasshopper treatment	0.60	1	0.44
Source elevation × Water availability × Year	2.31	1	0.13
Source elevation × Grasshopper treatment × Year	3.14	1	0.07
Water availability × Grasshopper treatment × Year	0.07	1	0.79
Source elevation × Water availability × Grasshopper treatment × Year	0.42	1	0.52
Random Effects			
Plant Identifier	0	1	1
Accession	10.39	1	0.0013
Block nested within cage	40.92	1	<0.0001

Table 3.S7b: Slopes for specific leaf area as a function of source elevation for each year. We extracted betas and confidence intervals using the emtrends function from the *emmeans* R package ver. 1.8.8 (Lenth et al. 2023) and exponentiated them owing to the lognormal distribution used to model this trait. Significant betas are in bold typeface.

Year	Exponentiated β	95% CI, lower	95% CI, upper
2022	1.094	1.056	1.13
2023	1.03	0.99	1.07

Table 3.S8: Analysis of plasticity and clines of leaf succulence in response to water availability, Grasshopper treatment: We analyzed leaf succulence as a function of source elevation, watering and herbivore treatment and year using a generalized linear model with a log normal distribution with a log link (function glmmTMB, R package *glmmTMB* ver. 1.1.4, Brooks et al., 2017). We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car* ver. 3.0-12, Fox & Weisburg, 2019). Significant effects after correction for multiple tests are in bold typeface.

	χ^2	DF	p-value
Source elevation	1.39	1	0.24
Water availability	0.02	1	0.90
Grasshopper treatment	22.17	1	<0.0001
Year	243.72	1	<0.0001
Source elevation × Water availability	0.15	1	0.70
Source elevation × Grasshopper treatment	2.16	1	0.14
Source elevation × Year	6.25	1	0.0124
Water availability × Grasshopper treatment	10.09	1	0.0015
Water availability × Year	0.41	1	0.52
Grasshopper treatment × Year	36.64	1	<0.0001
Source elevation × Water availability × Grasshopper treatment	0.43	1	0.51
Source elevation × Water availability × Year	1.11	1	0.29
Source elevation × Grasshopper treatment × Year	1.28	1	0.26
Water availability × Grasshopper treatment × Year	0.81	1	0.37
Source elevation × Water availability × Grasshopper treatment × Year	0.64	1	0.42
Random Effects			
Plant Identifier	71.34	1	<0.0001
Accession	0	1	1
Block nested within cage	0.77	1	0.381

Table 3.S9: Analysis of plasticity and clines of day of first flowering in response to water availability and grasshopper treatment: We analyzed day of first flowering as a function of source elevation, watering and herbivore treatment and year using a generalized linear model with a log normal distribution with a log link (function glmmTMB, R package *glmmTMB* ver. 1.1.4, Brooks et al., 2017). We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car* ver. 3.0-12, Fox & Weisburg, 2019). Significant effects are in bold typeface.

	χ^2	DF	p-value
Source elevation	0.07	1	0.79
Water availability	1.68	1	0.20
Grasshopper treatment	2.65	1	0.10
Year	14.88	1	0.00011
Source elevation × Water availability	14.83	1	0.00012
Source elevation × Grasshopper treatment	4.25	1	0.0392
Source elevation × Year	4.77	1	0.0290
Water availability × Grasshopper treatment	1.47	1	0.22
Water availability × Year	0.04	1	0.85
Grasshopper treatment × Year	5.00	1	0.0253
Source elevation × Water availability × Grasshopper treatment	9.80	1	0.0017
Source elevation × Water availability × Year	6.98	1	0.0082
Source elevation × Grasshopper treatment × Year	1.16	1	0.28
Water availability × Grasshopper treatment × Year	1.34	1	0.25
Source elevation × Water availability × Grasshopper treatment × Year	2.52	1	0.11
Random Effects			
Plant Identifier	0	1	1
Accession	6.80	1	0.0091
Block nested within cage	0	1	1

Table 3.S9b: Slopes for day of first flowering as a function of source elevation, grasshopper treatment, and water availability. We extracted betas and confidence intervals using the emtrends function from the *emmeans* R package ver. 1.8.8 (Lenth et al. 2023) and exponentiated them owing to the lognormal distribution needed to model this trait. Significant betas are in bold typeface.

Water availability	Grasshopper treatment	Exponentiated β	95% CI, lower	95% CI, upper
Restricted	Addition	0.988	0.972	1.004
Restricted	Removal	0.98	0.955	1.006
Supplemental	Addition	0.96	0.944	0.976
Supplemental	Removal	0.978	0.966	0.99

Table 3.S10: Analysis of plasticity and clines of flowering duration in response to water availability and grasshopper treatment: We analyzed flowering duration as a function of source elevation, watering and herbivore treatment and year using a generalized linear model with a gaussian distribution (function glmmTMB, R package *glmmTMB* ver. 1.1.4, Brooks et al., 2017). We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car* ver. 3.0-12, Fox & Weisburg, 2019). Significant effects are in bold typeface.

	χ^2	DF	p-value
Source elevation	1.57	1	0.21
Water availability	0.21	1	0.64
Grasshopper treatment	4.23	1	0.0396
Year	0.11	1	0.74
Source elevation × Water availability	0.63	1	0.43
Source elevation × Grasshopper treatment	0.24	1	0.62
Source elevation × Year	0.65	1	0.42
Water availability × Grasshopper treatment	4.00	1	0.0453
Water availability × Year	0.33	1	0.56
Grasshopper treatment × Year	0.10	1	0.75
Source elevation × Water availability × Grasshopper treatment	0.24	1	0.62
Source elevation × Water availability × Year	0.04	1	0.84
Source elevation × Grasshopper treatment × Year	0.38	1	0.54
Water availability × Grasshopper treatment × Year	0.04	1	0.85
Source elevation × Water availability × Grasshopper treatment × Year	0.04	1	0.85
Random Effects			
Plant Identifier	0	1	1
Accession	0.001	1	0.97
Block nested within cage	0.37	1	0.83

Table 3.S11: Analysis of plasticity and clines of height of tallest stem at flowering in response to water availability and grasshopper treatment: We analyzed height of tallest bolt at flowering as a function of source elevation, watering and herbivore treatment using a generalized linear model with a log normal distribution with a log link (function glmmTMB, R package *glmmTMB* ver. 1.1.4, Brooks et al., 2017). We included year as a covariate to account for variation across years.We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car* ver. 3.0-12, Fox & Weisburg, 2019). Significant effects are in bold typeface.

	χ^2	DF	p-value
Source elevation	14.96	1	0.00011
Water availability	0.62	1	0.43
Grasshopper treatment	1.94	1	0.16
Year	19.24	1	<0.0001
Source elevation × Water availability	1.99	1	0.16
Source elevation × Grasshopper treatment	0.83	1	0.36
Water availability × Grasshopper treatment	2.62	1	0.11
Source elevation × Water availability × Grasshopper treatment	0.92	1	0.34
Random Effects			
Plant ID	3.7	1	0.05
Accession	3.7	1	0.05
Block nested within cage	0	1	1

Table 3.S12 Selection analysis using probability of reproduction under water availability and grasshopper treatment: We analyzed how foliar traits (leaf damage averaged across all censuses within a year, specific leaf area, leaf succulence) influence the probability of reproduction using a generalized linear model with a binomial distribution with a logit link (function glmmTMB, R package *glmmTMB,* Brooks et al. 2017). We included initial size as a covariate to account for size differences between the individuals at planting. We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car*, Fox & Weisburg, 2019). Significant effects are in bold typeface. We used an adjusted alpha of 0.025 (0.05/2) to assess significance and account for analyses of selection via two fitness components.

	χ^2	DF	p-value
Initial size	28.91	1	<0.0001
Water availability	0.78	1	0.378
Grasshopper treatment	0.93	2	0.335
Year	5.26	3	0.022
Leaf area removed	0.04	2	0.851
Leaf succulence	4.87	2	0.027
Leaf succulence^2	19.68	3	<0.0001
Specific leaf area	0.02	2	0.885
Specific leaf area^2	6.09	3	0.0136
Water availability × Grasshopper treatment	0.02	2	0.897
Water availability × year	1.57	2	0.21
Grasshopper treatment × year	13.3	3	0.00027
Water availability × Leaf area removed	0.81	2	0.367
Grasshopper treatment × Leaf area removed	0.43	2	0.512
Water availability × Leaf succulence	0.66	2	0.416
Grasshopper treatment × Leaf succulence	6.41	3	0.01137
Water availability × Specific leaf area	0.15	2	0.703
Grasshopper treatment × Specific leaf area	0.48	2	0.487
Water availability × Grasshopper treatment × year	4.08	2	0.044
Water availability × Grasshopper treatment × Leaf area removed	0.16	2	0.685
Water availability × Grasshopper treatment × Leaf succulence	1.84	2	0.175
Water availability × Grasshopper treatment × Specific leaf area	1.78	2	0.183
Random effects			
Plant ID	0	1	1
Accession	0	1	1
Block nested within cage	9.127	1	0.0025

Table 3.S12b: Odds ratios for selection on specific leaf area and leaf succulence using probability of reproduction. We extracted odds ratios and confidence intervals using the emtrends function from the *emmeans* R package ver. 1.8.8 (Lenth et al. 2023). For the quadratic effects, we present undoubled coefficients. To calculate selection gradients, we would need to convert the units to the appropriate scale for linear effects (Janzen and Stern 1998) and then double the gradient for quadratic effects (Stinchcombe et al. 2008). Significant odds ratios are in bold typeface.

Trait	Water availability	Grasshopper treatment	odds ratio	95% CI, lower	95% CI, upper
Specific leaf area, linear	Restricted	Addition	0.929	0.341	2.529
Specific leaf area, linear	Supplemental	Addition	0.717	0.308	1.674
Specific leaf area, linear	Restricted	Removal	1.456	0.68	3.117
Specific leaf area, linear	Supplemental	Removal	0.356	0.176	0.72
Specific leaf area, quadratic	Restricted	Addition	0.631	0.438	0.909
Specific leaf area, quadratic	Supplemental	Addition	0.631	0.438	0.909
Specific leaf area, quadratic	Restricted	Removal	0.631	0.438	0.909
Specific leaf area, quadratic	Supplemental	Removal	0.631	0.438	0.909
Leaf succulence, linear	Restricted	Addition	3.822	1.162	12.579
Leaf succulence, linear	Supplemental	Addition	2.036	0.721	5.749
Leaf succulence, linear	Restricted	Removal	0.537	0.205	1.409
Leaf succulence, linear	Supplemental	Removal	1.082	0.556	2.104
Leaf succulence, quadratic	Restricted	Addition	0.419	0.287	0.616
Leaf succulence, quadratic	Supplemental	Addition	0.419	0.287	0.616
Leaf succulence, quadratic	Restricted	Removal	0.419	0.287	0.616
Leaf succulence, quadratic	Supplemental	Removal	0.419	0.287	0.616

Table 3.S13: Fecundity selection on foliar traits and reproductive phenology from a generalized linear model (gamma distribution with a log link function glmmTMB, R package *glmmTMB*). We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car*). Significant effects at the adjusted alpha of 0.025 (0.05/2) are in bold typeface.

	χ^2	DF	p-value
Initial size	1.54	1	0.21
Water availability	0.12	1	0.73
Grasshopper treatment	1.34	1	0.25
Year	12.89	1	0.00033
Flowering time	11.36	1	0.00075
Height at flowering	5.02	1	0.02501
Duration of flowering	37.36	1	<0.0001
Duration of flowering^2	21.7	1	<0.0001
Specific leaf area	14.1	1	0.00017
Specific leaf area^2	4.46	1	0.035
Leaf succulence	10.68	1	0.00108
Leaf area removed	0.022	1	0.88
Leaf area removed^2	0.22	1	0.64
Water availability × Grasshopper treatment	0.96	1	0.33
Water availability × year	0.695	1	0.404
Grasshopper treatment × year	8.52	1	0.00351
Water availability × Flowering time	4.35	1	0.037
Grasshopper treatment × Flowering time	4.6	1	0.032
Water availability × Height at flowering	0.031	1	0.86
Grasshopper treatment × Height at flowering	1.82	1	0.177
Water availability × Flowering duration	7.19	1	0.00732
Grasshopper treatment × Flowering duration	40.39	1	<0.0001
Water availability × Flowering duration^2	20.97	1	<0.0001
Grasshopper treatment × Flowering duration^2	9.48	1	0.00207
Water availability × Specific leaf area	16.79	1	<0.0001
Grasshopper treatment × Specific leaf area	0.068	1	0.795
Water availability × Specific leaf area^2	4.66	1	0.031
Grasshopper treatment × Specific leaf area^2	6.1	1	0.01348
Water availability × Leaf succulence	0.001	1	0.977
Grasshopper treatment × Leaf succulence	12.34	1	0.00044
Water availability × Leaf area removed	1.21	1	0.271
Grasshopper treatment × Leaf area removed	0.072	1	0.789
Water availability × Leaf area removed^2	5.08	1	0.0242
Grasshopper treatment × Leaf area removed^2	0.062	1	0.803
Water availability × Grasshopper treatment × year	3.696	1	0.055
Water availability × Grasshopper treatment × Flowering time	8.17	1	0.00426
Water availability × Grasshopper treatment × Height at flowering	1.41	1	0.235
Water availability × Grasshopper treatment × Flowering duration	29.88	1	<0.0001
Water availability × Grasshopper treatment × Specific leaf area	2.24	1	0.134
Water availability × Grasshopper treatment × Specific leaf area^2	8.25	1	0.0040715
Water availability × Grasshopper treatment × Leaf succulence	1.06	1	0.302
Water availability × Grasshopper treatment × Leaf area removed	0.796	1	0.372
Water availability × Grasshopper treatment × Leaf area removed^2	7.74	1	0.0054041
Random effects			
Genotype	0	1	0.9998
Cage nested within block	0	1	0.9999

Table 3.S13b: Coefficients for fecundity selection. We extracted coefficients and confidence intervals using the emtrends function from the *emmeans* R package ver. 1.8.8 (Lenth et al. 2023). For the quadratic effects, we present undoubled coefficients. To calculate selection gradients, one would need to convert the units to the appropriate scale for linear effects (Janzen and Stern 1998) and then double the gradient for quadratic effects (Stinchcombe et al. 2008), which we have not done here because we prefer to display the output of the statistical analyses. Significant effects are in bold typeface.

Trait	Water treatment	Grasshopper treatment	odds ratio	95% CI, lower	95% CI, upper
Flowering time, linear	Restricted	Addition	0.403	0.237	0.684
Flowering time, linear	Supplemental	Addition	0.727	0.616	0.856
Flowering time, linear	Restricted	Removal	0.826	0.563	1.213
Flowering time, linear	Supplemental	Removal	0.523	0.403	0.678
Flowering duration, linear	Restricted	Addition	2.309	1.766	3.022
Flowering duration, linear	Supplemental	Addition	1.315	0.961	1.802
Flowering duration, linear	Restricted	Removal	0.38	0.24	0.602
Flowering duration, linear	Supplemental	Removal	1.568	1.288	1.908
Flowering duration, quadratic	Restricted	Addition	0.614	0.5	0.754
Flowering duration, quadratic	Supplemental	Addition	1.096	0.934	1.287
Flowering duration, quadratic	Restricted	Removal	0.45	0.344	0.588
Flowering duration, quadratic	Supplemental	Removal	0.804	0.71	0.91
Height at flowering, linear			1.43	1.219	1.68
Leaf succulence, linear	Restricted	Addition	1.659	1.225	2.246
Leaf succulence, linear	Supplemental	Addition	1.647	1.097	2.471
Leaf succulence, linear	Restricted	Removal	0.851	0.679	1.068
Leaf succulence, linear	Supplemental	Removal	1.162	0.92	1.466
Specific leaf area, linear	Restricted	Addition	0.55	0.403	0.751
Specific leaf area, linear	Supplemental	Addition	1.447	1.035	2.022
Specific leaf area, linear	Restricted	Removal	0.588	0.399	0.864
Specific leaf area, linear	Supplemental	Removal	0.958	0.803	1.142

Specific leaf area, quadratic	Restricted	Addition	0.719	0.53	0.977
Specific leaf area, quadratic	Supplemental	Addition	1.063	0.888	1.273
Specific leaf area, quadratic	Restricted	Removal	1.081	0.971	1.203
Specific leaf area, quadratic	Supplemental	Removal	0.895	0.776	1.031
Leaf area removed by herbivores, linear	Restricted	Addition	0.975	0.692	1.373
Leaf area removed by herbivores, linear	Supplemental	Addition	1.332	0.868	2.042
Leaf area removed by herbivores, linear	Restricted	Removal	0.912	0.644	1.292
Leaf area removed by herbivores, linear	Supplemental	Removal	0.9	0.661	1.226
Leaf area removed by herbivores, quadratic	Restricted	Addition	0.948	0.757	1.186
Leaf area removed by herbivores, quadratic	Supplemental	Addition	0.603	0.436	0.834
Leaf area removed by herbivores, quadratic	Restricted	Removal	0.912	0.747	1.114
Leaf area removed by herbivores, quadratic	Supplemental	Removal	1.168	0.94	1.451

Table 3.S14: Hurdle model analysis of fitness in response to source elevation, water availability and grasshopper treatment: We analyzed fitness (the probability of reproduction and fecundity amongst plants that reproduced successfully) as a function of source elevation, water treatment and herbivore treatment using a generalized linear mixed model with a zero-inflated Gamma distribution (function glmmTMB, R package *glmmTMB* ver. 1.1.4, Brooks et al., 2017). This framework jointly examines the probability of reproduction in a logistic regression with a binary distribution and logit link and non-zero fecundity data using a gamma distribution and log link. We included initial size as a covariate to account for size differences between the individuals at planting and year for variation across years of the experiment. We determined significance of fixed effects using Type III Sums of Squares (function Anova, R package *car* ver. 3.0-12, Fox & Weisburg, 2019). Significant effects are in bold typeface.

	Probability of reproduction			Fecundity amongst plants that reproduced		
	χ^2	DF	p-value	χ^2	DF	p-value
Initial size	35.81	1	<0.0001	2.9524	1	0.09
Year	6.46	1	0.0110	0.0195	1	0.89
Water treatment	0.08	1	0.78	0.2979	1	0.59
Herbivore treatment	0.06	1	0.81	1.0088	1	0.32
Source elevation	0.52	1	0.47	2.4005	1	0.12
Source elevation^2	0.02	1	0.88	1.4222	1	0.23
Water availability × Grasshopper treatment	0.21	1	0.64	2.2739	1	0.13
Source elevation × Water availability	2.51	1	0.11	3.1775	1	0.07
Source elevation × Grasshopper treatment	0.01	1	0.91	0.5181	1	0.47
Source elevation^2 × Water availability	0.01	1	0.93	5.7089	1	0.0169
Source elevation^2 × Grasshopper treatment	0.02	1	0.89	0.017	1	0.89
Source elevation × Water availability × Grasshopper treatment	0.03	1	0.87	0.2094	1	0.65
Source elevation^2 × Water availability × Grasshopper treatment	0.26	1	0.61	0.7389	1	0.39
			Random effects			
Plant ID	0	1	1	0	1	1
Accession	0.57	1	0.45	0	1	1
Block nested within cage	0	1	1	0	1	1

Table 3.S15: Table of Pearson correlations between each trait from the common garden experiment. To examine trait-trait associations in each treatment level, we used the function cor.test from the R package *stats* ver. 4.3.0 (R Core Team 2013). Pearson correlation values are above the p values for each trat-trait associations. Bolded values indicate statistically significant correlations.

		Leaf area removed	Specific leaf area	Succulence	Flowering phenology	Flowering duration
Restricted watering, Grasshopper addition	Specific leaf area	-0.17 0.0449				
	Succulence	-0.08 0.09	0.06 0.47			
	Flowering phenology	-0.11 0.58	0.10 0.63	-0.41 0.0448		
	Flowering duration	0.08 0.72	0.09 0.70	0.03 0.90	-0.30 0.15	
	Tallest stem at flowering	-0.34 0.09	0.10 0.63	-0.13 0.55	0.60 0.0011	0.14 0.51
Supplemental watering, Grasshopper addition	Specific leaf area	-0.17 0.05				
	Succulence	0.06 0.047	-0.02 0.79			
	Flowering phenology	-0.19 0.41	0.19 0.43	-0.29 0.21		
	Flowering duration	0.15 0.51	-0.51 0.226	0.29 0.22	-0.41 0.06	
	Tallest stem at flowering	-0.26 0.26	-0.39 0.09	-0.02 0.92	0.22 0.34	0.01 0.96
Restricted watering, Grasshopper removal	Specific leaf area	-0.14 0.05				
	Succulence	-0.10 0.09	0.14 0.06			
	Flowering phenology	0.39 0.0377	-0.15 0.43	-0.17 0.39		
	Flowering duration	-0.38 0.0488	0.08 0.69	-0.01 0.96	-0.02 0.91	
	Tallest stem at flowering	-0.15 0.45	0.17 0.39	0.14 0.48	0.32 0.09	0.44 0.0192
Supplemental watering, Grasshopper removal	Specific leaf area	0.12 0.12				
	Succulence	-0.11 0.14	-0.22 0.0033			
	Flowering phenology	0.30 0.07	-0.36 0.0249	-0.46 0.0041		
	Flowering duration	0.16 0.35	-0.34 0.0404	0.46 0.0051	0.05 0.77	
	Tallest stem at flowering	-0.02 0.92	-0.31 0.05	-0.08 0.63	0.44 0.0055	0.17 0.32

Table 3.S16: Analysis of fitness from experiment 2 in the context of local adaptation. To explore whether herbivores could contribute to local adaptation, we conducted a field experiment in two common gardens at different elevations (2890m and 3133m above sea level) in which we applied Bt pesticide to reduce herbivory. We used a hurdle model approach in glmmTMB to model lifetime fitness as a function of initial plant size, cohort, pesticide treatment, garden, (linear and quadratic effects of) source elevation of the accessions and three way interactions of treatment, garden and source elevation. This model uses a zero-inflated Gamma distribution to jointly model the probability of reproduction and fecundity amongst individuals that reproduced. Significant parameters are highlighted in bold typeface.

	Probability of reproduction			Fecundity amongst plants that reproduced		
	χ^2	df	p-value	χ^2	df	p-value
Initial plant size	99.75	1	<0.0001	0.14	1	0.70
cohort	11.34	2	0.0034	26.06	2	<0.0001
Year	10.36	2	0.0056	16.88		0.0002
Source elevation (standardized)	0.90	1	0.34	1.66	1	0.20
Treatment	1.11	1	0.29	5.55	1	0.0184
Garden	0.00	1	0.99	8.29	1	0.0039
Treatment × Source elevation	0.62	1	0.43	5.59	1	0.0180
Garden × Source elevation	0.54	1	0.46	0.62	1	0.43
Treatment × Garden	0.56	1	0.45	2.60	1	0.11
Treatment × Garden × Source elevation	1.30	1	0.25	1.02	1	0.31
	Random effects					
Plant ID	0	1	1	3.27	1	0.07
Accession	44.67	1	<0.0001	0	1	1
Block nested within garden	4.14	1	0.0418	0.14	1	0.70

Table 3.S17: Odds ratio for the effect of source elevation on foliar damage by insects under each garden, treatment combination. We analyzed data on herbivory for every plant from the last census of the 2022 growing season. Significant odds ratios are in bold typeface. We analyzed herbivory as a function of source elevation, garden and herbivory treatment using a generalized linear model with a beta distribution with a logit link (function gamlss, R package *gamlss* ver. 5.4-20, Rigby & Stasinopoulos). Odds ratios <1 indicate that herbivory declined with source elevation and odds ratios >1 indicate that herbivore increased with source elevation (as predicted).

Garden elevation	Herbivory treatment	Odds ratio	95% CI, lower	95% CI, upper
2890 m	Control	1.36	1.27	1.46
2890 m	Pesticide	1.14	1.03	1.25
3133 m	Control	1.06	0.95	1.18
3133 m	Pesticide	1.07	0.96	1.19

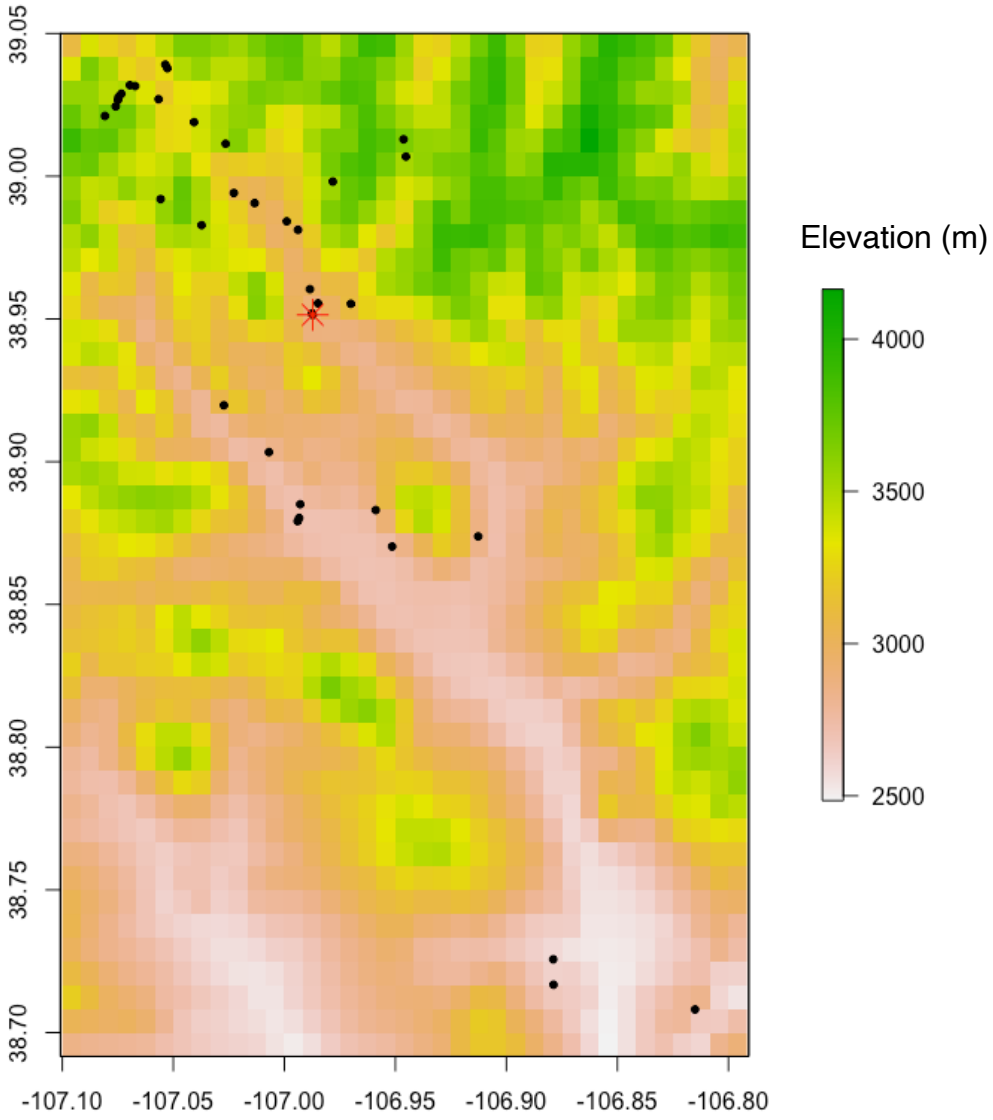

Figure 3.S1: Locations and elevation of source populations where seed was originally collected for the common garden experiment. Each black dot represents the location of one of the 36 maternal families represented in the study. The location of the common garden experiment is indicated by the red star. Before the establishment of the experiment, field-collected seeds were grown for one generation in a greenhouse experiment for at least one generation to minimize maternal effects. Latitude, longitude, and elevation for each maternal family is found in Table S1b. The map is colored by elevation.

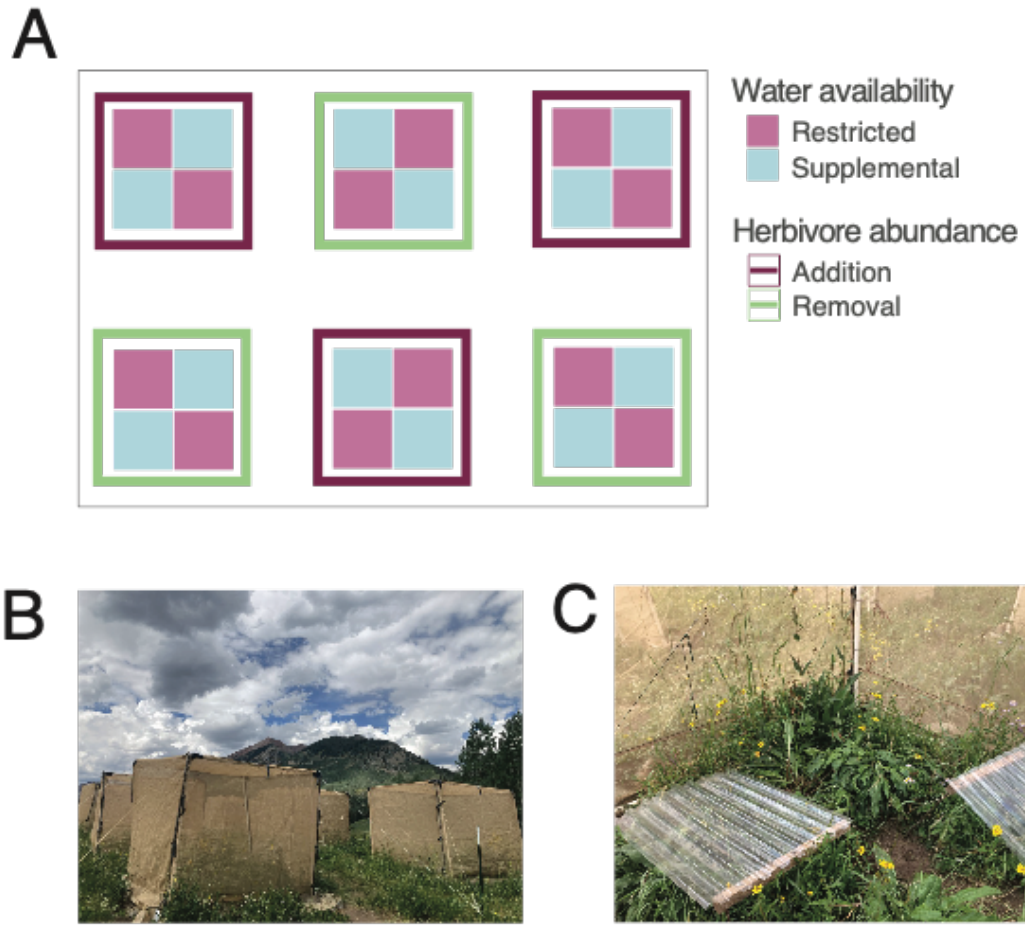

Figure 3.S2: Design of the common garden experiment manipulating herbivory and water availability. A) An overview of the treatments in common garden experiment. Each of the squares represent the cage-level Grasshopper treatment treatment, dark purple squares for grasshopper addition and green squares for grasshopper removal. The smaller squares represent the block level water availability treatment, pink for water restriction or blue for water supplementation. B) An image of the six 1.8m^3 cages arranged. C) An image taken from the inside of one of the cages showing the experimental blocks. There are two rainout shelters deployed over the blocks under the water restriction treatment. The two water supplementation blocks are uncovered. Rainout shelters were deployed immediately before forecasted rain or as soon as we could reach the garden if unforecasted rain occurred. They were removed at the end of the rain event.

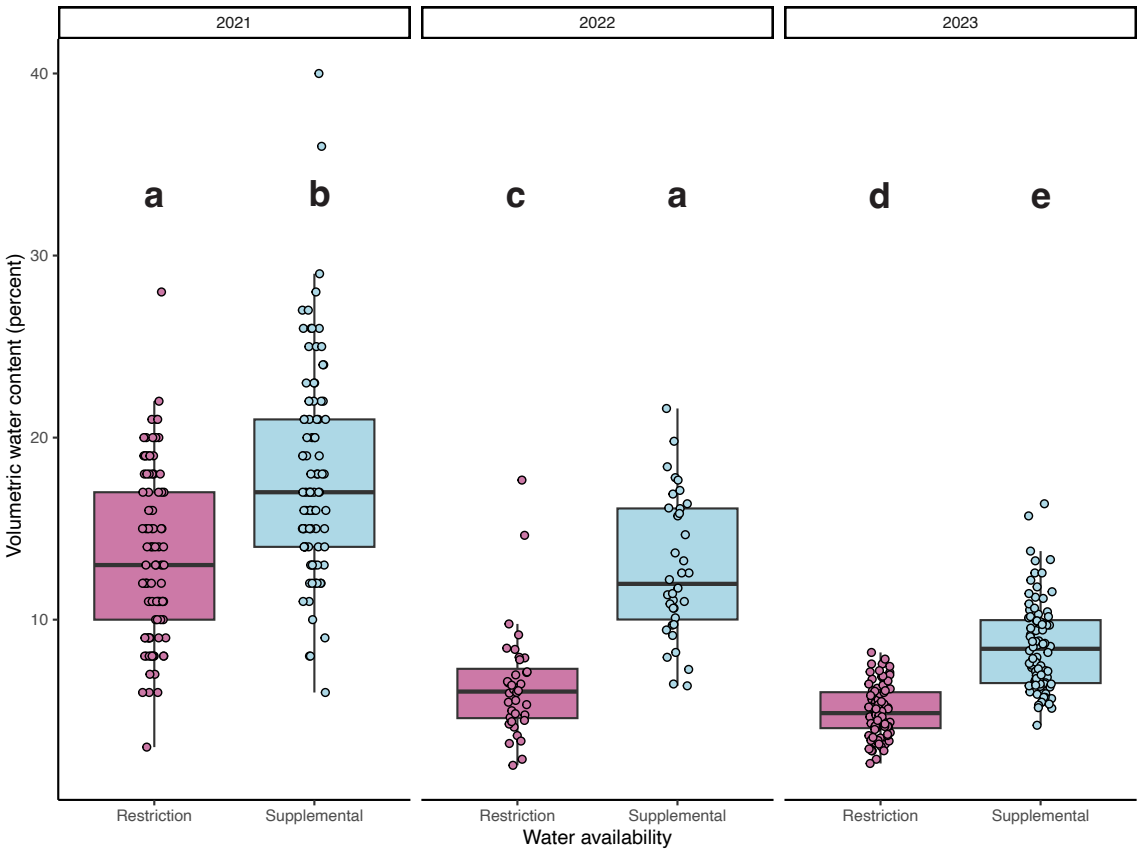

Figure 3.S3: Water volumetric content is lower under water restriction across three growing seasons. We monitored soil moisture levels by measuring volumetric water content twice a week at the same time in all 24 experimental blocks throughout the experiment. Boxplots display data from restricted watering (pink) and supplemental watering (blue) treatments. Letters indicate significant pairwise differences of least squared means adjusted for multiple comparisons.

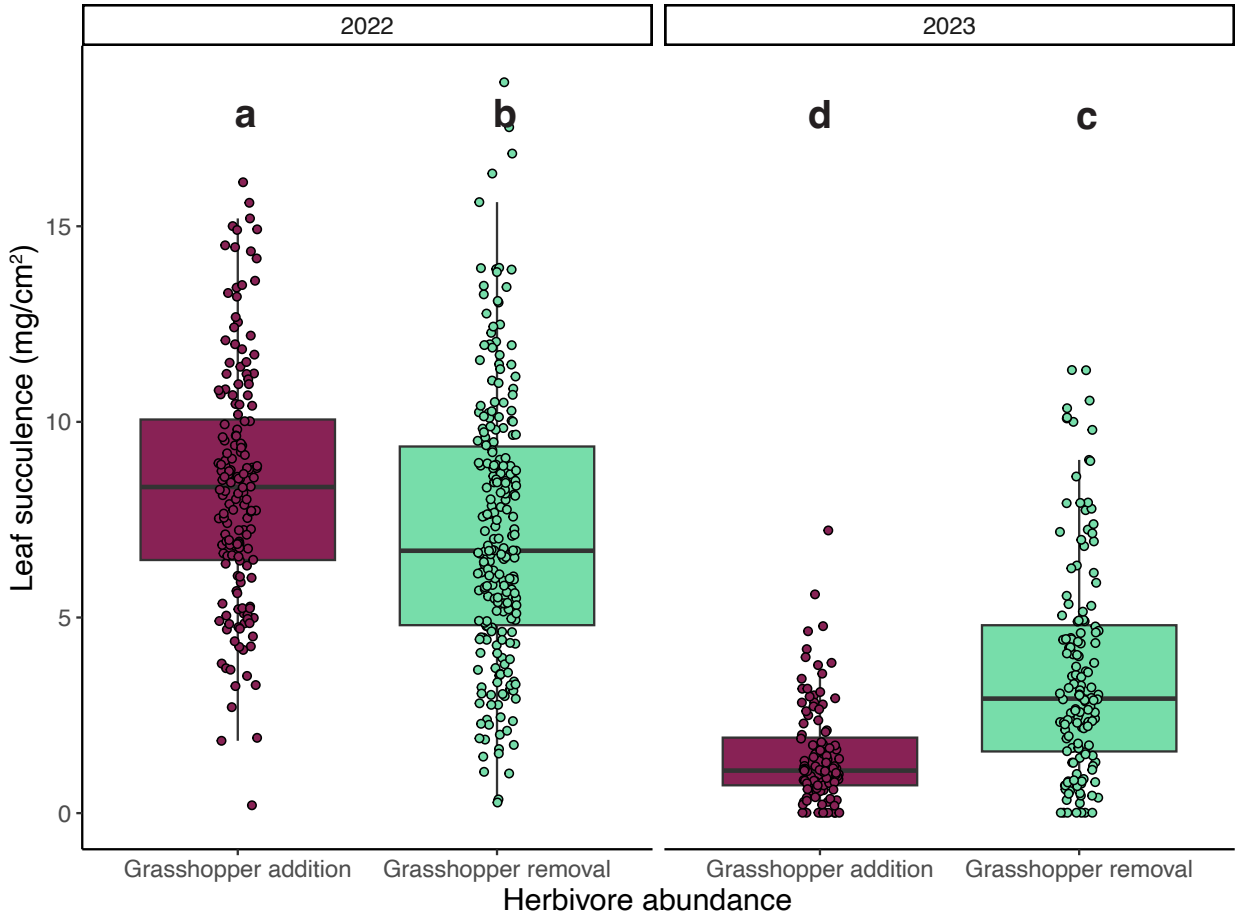

Figure 3.S4: Leaf succulence was lower under grasshopper removal compared to grasshopper addition in 2022 but the relationship reversed in 2023. We calculated succulence as fresh leaf weight subtracted by dry leaf weight divided by leaf area (Delf 1912; Reimann and Breckle 1995). Boxplots display data from the Grasshopper treatment treatment levels: grasshopper addition (dark purple) and grasshopper removal (green). Letters indicate significant pairwise differences of least squared means adjusted for multiple comparisons.

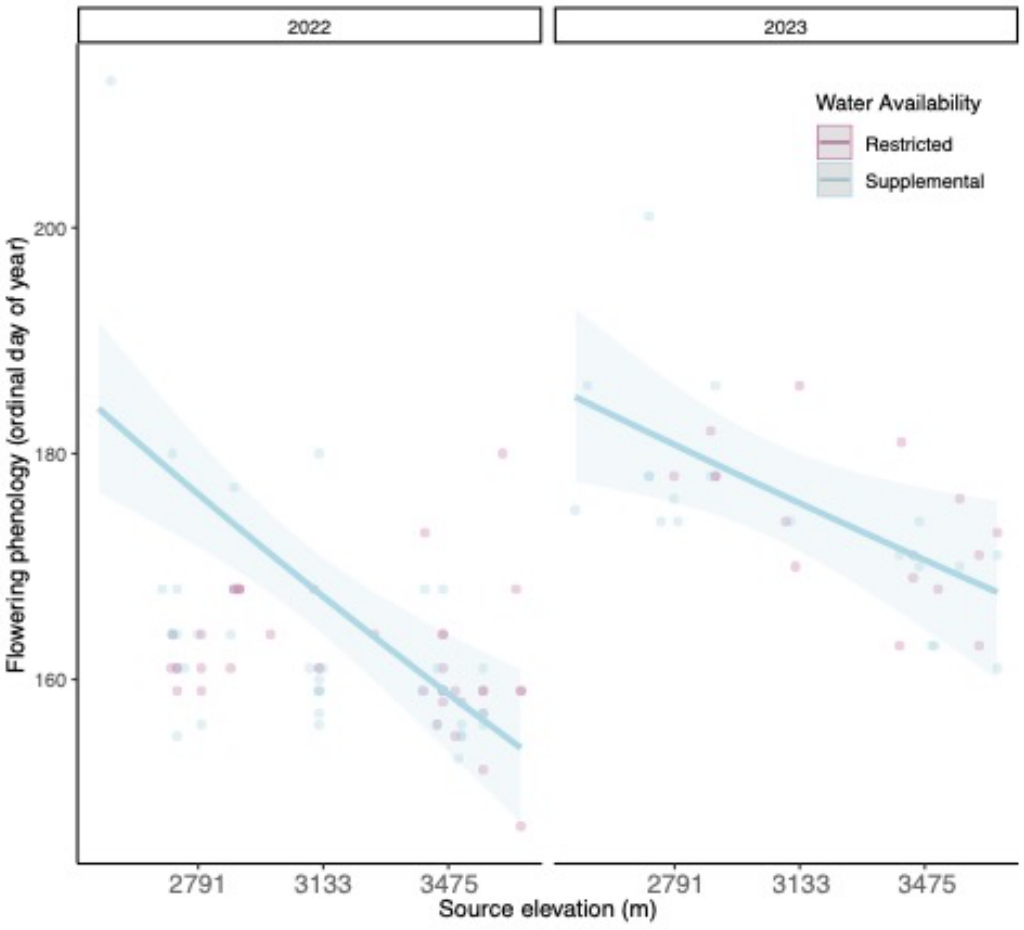

Figure 3.S5: The elevational cline in flowering phenology varied across years. Raw data points are plotted from restricted watering (pink) and supplemental watering (blue) across herbivore treatment levels. Only the significant regression lines are plotted; there was no significant cline under restricted watering.

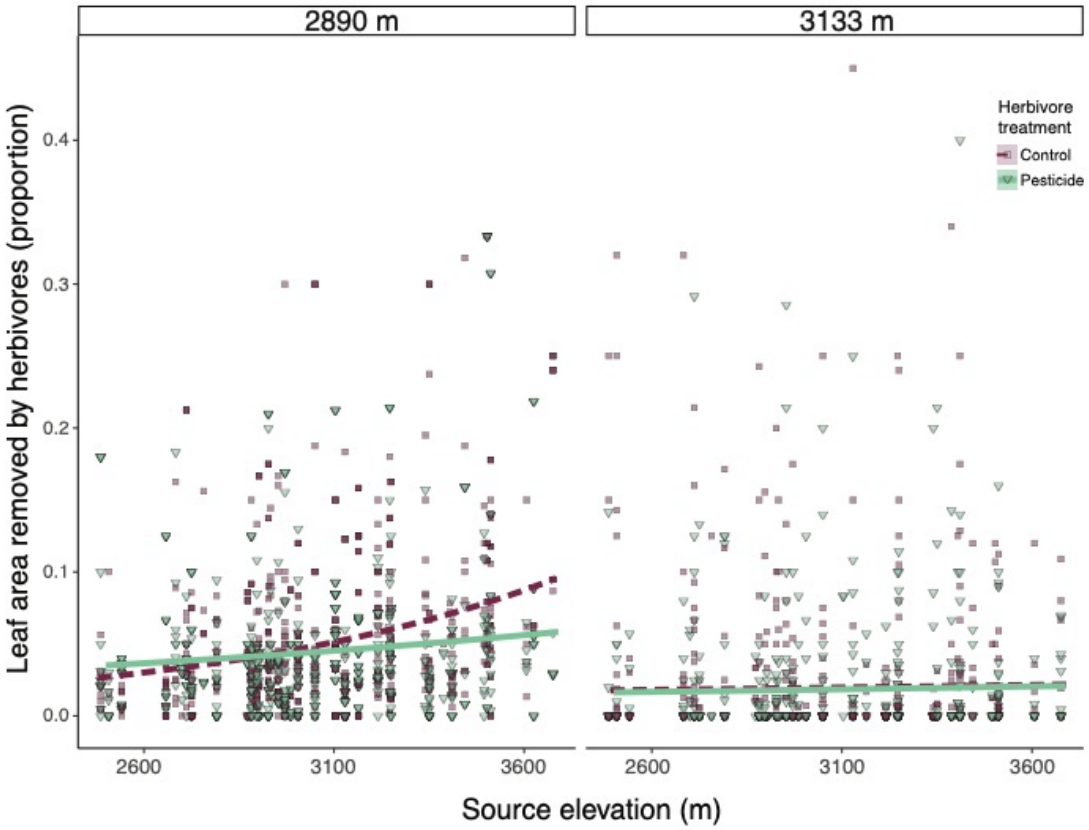

Figure 3.S6: Herbivory varies with treatment and source elevation. Bt was the most effective in depressing herbivory for high elevation accessions in the lower elevation garden. Raw data points are plotted from control (dark purple) and pesticide (green).