SUPPLEMENTARY DATA

TABLE S1. Segregating populations of *Alopecurus myosuroides* analysed and number of seeds analysed

Segregating population	Experiment	no. seeds used	No. seeds recovered after burial (% # seeds used)	No. seeds genotyped (% # seeds used)	Genotype at *ACCase* (no. plants)*		
					M/M	M/W	W/W
Leu-1781-D24-04	Fresh seed 2004	200	-	175 (87.5)	43	88	44
	Buried seed 2004	400	326 (81.5)	90 (22.5)	27	44	19
Leu-1781-D57-04	Fresh seed 2004	200	-	179 (89.5)	46	82	51
	Buried seed 2004	400	315 (78.8)	246 (61.5)	63	125	58
Leu-1781-D98-04	Fresh seed 2004	200	-	190 (95.0)	57	82	51
	Buried seed 2004	400	325 (81.3)	131 (32.8)	46	64	21
Leu-1781-D121-04	Fresh seed 2004	200	-	112 (56.0)	32	49	31
	Buried seed 2004	400	321 (80.3)	131 (32.8)	**41****	**40****	**50****
Leu-1781-D143-04	Fresh seed 2004	200	-	189 (94.5)	49	92	48
	Buried seed 2004	400	330 (82.5)	114 (28.5)	26	59	29
Asn-2041-D60-04	Fresh seed 2004	333	-	284 (85.3)	77	143	64
	Buried seed 2004	666	465 (69.8)	121 (18.2)	27	64	30
Asn-2041-D83-04	Fresh seed 2004	333	-	295 (88.6)	73	155	67
	Buried seed 2004	666	562 (84.4)	378 (56.8)	81	197	100
Asn-2041-D121-04	Fresh seed 2004	333	-	136 (40.8)	24	64	48
	Buried seed 2004	666	501 (75.2)	401 (60.2)	88	206	107
Gly-2078-D41-04	Fresh seed 2004	500	-	449 (89.8)	**59*****	**198*****	**192*****
	Buried seed 2004	1000	792 (79.2)	429 (42.9)	92	207	130
Gly-2078-D83-04	Fresh seed 2004	500	-	443 (88.6)	**82*****	**198*****	**163*****

	Buried seed 2004	1000	692 (69.2)	94 (9.4)	**16***	**39***	**39***
Leu-1781-D24-05	Fresh seed 2005	200	-	177 (88.5)	38	97	42
	Buried seed 2005	400	272 (68.0)	243 (60.8)	68	116	59
Leu-1781-D57-05	Fresh seed 2005	200	-	181 (90.5)	36	100	45
	Buried seed 2005	400	200 (50.0)	100 (25.0)	24	48	28
Leu-1781-D98-05	Fresh seed 2005	200	-	183 (91.5)	43	84	56
	Buried seed 2005	400	255 (63.8)	102 (25.5)	27	47	28
Leu-1781-D121-05	Fresh seed 2005	200	-	191 (95.5)	44	90	57
	Buried seed 2005	400	228 (57.0)	118 (29.5)	23	61	34
Leu-1781-D143-05	Fresh seed 2005	200	-	191 (95.5)	41	101	49
	Buried seed 2005	400	223 (55.8)	191 (47.8)	**35***	**87***	**69***
Asn-2041-D60-05	Fresh seed 2005	333	-	280 (84.1)	69	136	75
	Buried seed 2005	666	310 (46.5)	137 (20.6)	37	61	39
Asn-2041-D83-05	Fresh seed 2005	333	-	299 (89.8)	71	150	78
	Buried seed 2005	666	424 (63.7)	292 (43.8)	77	138	77
Asn-2041-D121-05	Fresh seed 2005	333	-	294 (88.3)	88	141	65
	Buried seed 2005	666	361 (54.2)	282 (42.3)	73	125	84
Gly-2078-D41-05	Fresh seed 2005	500	-	405 (81.0)	92	199	114
	Buried seed 2005	1000	480 (48.0)	174 (17.4)	46	81	47
Gly-2078-D83-05	Fresh seed 2005	500	-	409 (81.8)	95	192	122
	Buried seed 2005	1000	723 (72.3)	492 (49.2)	119	245	128

* *P*-value <0.01 (**) or < 0.001 (***) for the observed numbers of W/W, M/W and M/M plants to significantly differ from the expected numbers of such plants if the proportions of these genotypes were 25%, 50% and 25%, respectively.

TABLE S2. Test statistics for an effect of the explanatory variables used in the accelerated failure time (AFT) models describing seed germination (fresh seed experiments)

Variable	d.f.	χ^2	$P > \chi^2$
Leu-1781 ACCase			
Year	1	0.995	0.318
Population	4	96.55	< 0.0001
Genotype	2	19.55	< 0.0001
Year × Population	4	37.24	< 0.0001
Year × Genotype	2	1.852	0.396
Population × Genotype	8	8.900	0.351
Year × Population × Genotype	8	3.865	0.869
Asn-2041 ACCase			
Year	1	9.322	0.0023
Population	2	11.367	0.0034
Genotype	2	0.939	0.625
Year × Population	2	2.777	0.249
Year × Genotype	2	4.093	0.129
Population × Genotype	4	0.896	0.925
Year × Population × Genotype	4	3.736	0.442
Gly-2078 ACCase			
Year	1	41.004	< 0.0001
Population	1	0.015	0.901
Genotype	2	10.542	0.0051
Year × Population	1	7.454	0.0063
Year × Genotype	2	5.410	0.0669
Population × Genotype	2	0.236	0.888
Year × Population × Genotype	2	2.428	0.297

TABLE S3. Test statistics for an effect of the explanatory variables used in the accelerated failure time (AFT) models describing seed germination (buried seed experiments)

Variable	d.f.	χ^2	$P > \chi^2$
Leu-1781 ACCase			
Year	1	8.414	0.0037
Population	4	15.708	0.0034
Genotype	2	1.753	0.413
Year × Population	4	37.368	< 0.0001
Year × Genotype	2	1.277	0.528
Population × Genotype	8	9.378	0.311
Year × Population × Genotype	8	8.930	0.348
Asn-2041 ACCase			
Year	1	45.000	< 0.0001
Population	2	0.539	0.764
Genotype	2	15.481	0.0004
Year × Population	2	3.785	0.151
Year × Genotype	2	0.313	0.855
Population × Genotype	4	1.877	0.758
Year × Population × Genotype	4	3.710	0.447
Gly-2078 ACCase			
Year	1	62.822	< 0.0001
Population	1	15.553	< 0.0001
Genotype	2	4.396	0.111
Year × Population	1	128.240	< 0.0001
Year × Genotype	2	1.477	0.478
Population × Genotype	2	1.279	0.528
Year × Population × Genotype	2	3.701	0.157

TABLE S4. Tests statistics for an effect of the explanatory variables used in the generalised linear models describing germination success (fresh seed experiments)

Variable	d.f.	Deviance	$P > \chi^2$
Leu-1781 ACCase			
Year	1	33.179	< 0.0001
Population	4	24.276	< 0.0001
Genotype	2	29.409	< 0.0001
Year × Population	4	7.620	0.106
Year × Genotype	2	5.026	0.081
Population × Genotype	8	10.326	0.243
Year × Population × Genotype	8	7.941	0.439
Asn-2041 ACCase			
Year	1	19.796	< 0.0001
Population	2	0.585	0.746
Genotype	2	3.879	0.144
Year × Population	2	2.109	0.348
Year × Genotype	2	3.580	0.167
Population × Genotype	4	1.992	0.737
Year × Population × Genotype	4	3.466	0.483
Gly-2078 ACCase			
Year	1	0.269	0.604
Population	1	2.756	0.097
Genotype	2	4.947	0.084
Year × Population	1	2.230	0.135
Year × Genotype	2	27.693	< 0.0001
Population × Genotype	2	6.834	0.0328
Year × Population × Genotype	2	2.200	0.333

TABLE S5. Tests statistics for an effect of the explanatory variables used in the generalised linear models describing germination success (buried seed experiments)

Variable	d.f.	Deviance	$P > \chi^2$
Leu-1781 ACCase			
Year	1	38.600	< 0.0001
Population	4	10.123	0.0384
Genotype	2	5.774	0.056
Year × Population	4	8.360	0.079
Year × Genotype	2	1.984	0.371
Population × Genotype	8	4.818	0.777
Year × Population × Genotype	8	4.342	0.825
Asn-2041 ACCase			
Year	1	19.132	< 0.0001
Population	2	14.348	0.0008
Genotype	2	16.198	0.0003
Year × Population	2	7.861	0.0196
Year × Genotype	2	0.457	0.796
Population × Genotype	4	2.930	0.569
Year × Population × Genotype	4	0.247	0.993
Gly-2078 ACCase			
Year	1	18.304	< 0.0001
Population	1	7.333	0.0068
Genotype	2	1.354	0.508
Year × Population	1	0.185	0.667
Year × Genotype	2	0.066	0.967
Population × Genotype	2	2.718	0.257
Year × Population × Genotype	2	2.948	0.229

TABLE S6. Tests statistics for an effect of the explanatory variables used in linear models describing leaf length (fresh seed experiments)

Variable	d.f.	*F*	*P* > *F*
Leu-1781 ACCase			
Year	1	85.8108	< 0.0001
Population	4	5.6807	0.0002
Genotype	2	0.7128	0.491
Year × Population	4	3.3785	0.0091
Year × Genotype	2	2.1096	0.1221
Population × Genotype	8	0.6002	0.7781
Year × Population × Genotype	8	0.5616	0.810
Asn-2041 ACCase			
Year	1	2.763	0.097
Population	2	0.788	0.455
Genotype	2	1.314	0.267
Year × Population	2	1.053	0.350
Year × Genotype	2	0.338	0.713
Population × Genotype	4	0.817	0.514
Year × Population × Genotype	4	1.171	0.323
Gly-2078 ACCase			
Year	1	0.531	0.466
Population	1	1.340	0.248
Genotype	2	0.973	0.379
Year × Population	1	0.088	0.766
Year × Genotype	2	5.790	0.0033
Population × Genotype	2	4.115	0.0170
Year × Population × Genotype	2	1.414	0.244

TABLE S7. Tests statistics for an effect of the explanatory variables used in linear models describing leaf length (buried seed experiments)

Variable	d.f.	*F*	*P* > *F*
Leu-1781 ACCase			
Year	1	53.505	< 0.0001
Population	4	7.481	< 0.0001
Genotype	2	0.041	0.960
Year × Population	4	2.286	0.059
Year × Genotype	2	1.223	0.295
Population × Genotype	8	1.438	0.178
Year × Population × Genotype	8	2.042	0.0398
Asn-2041 ACCase			
Year	1	74.184	< 0.0001
Population	2	10.306	< 0.0001
Genotype	2	4.344	0.0134
Year × Population	2	5.261	0.0054
Year × Genotype	2	0.859	0.424
Population × Genotype	4	0.407	0.804
Year × Population × Genotype	4	0.799	0.526
Gly-2078 ACCase			
Year	1	29.136	< 0.0001
Population	1	12.749	0.0004
Genotype	2	6.244	0.0021
Year × Population	1	0.009	0.923
Year × Genotype	2	0.127	0.881
Population × Genotype	2	0.128	0.880
Year × Population × Genotype	2	1.558	0.212

TABLE S8. Tests statistics for an effect of the explanatory variables used in linear models describing root length (fresh seed experiments)

Variable	d.f.	*F*	*P* > *F*
Leu-1781 ACCase			
Year	1	9.712	0.0019
Population	4	3.608	0.0064
Genotype	2	3.923	0.0202
Year × Population	4	2.732	0.0282
Year × Genotype	2	0.700	0.497
Population × Genotype	8	0.712	0.681
Year × Population × Genotype	8	1.098	0.362
Asn-2041 ACCase			
Year	1	2.076	0.150
Population	2	7.241	0.0008
Genotype	2	3.106	0.0456
Year × Population	2	2.563	0.078
Year × Genotype	2	2.196	0.112
Population × Genotype	4	2.003	0.093
Year × Population × Genotype	4	0.242	0.914
Gly-2078 ACCase			
Year	1	5.663	0.0178
Population	1	1.402	0.237
Genotype	2	0.547	0.579
Year × Population	1	2.934	0.087
Year × Genotype	2	1.119	0.328
Population × Genotype	2	0.111	0.895
Year × Population × Genotype	2	1.336	0.264

TABLE S9. Tests statistics for an effect of the explanatory variables used in linear models describing root length (buried seed experiments).

Variable	d.f.	*F*	*P* > *F*
Leu-1781 ACCase			
Year	1	776.209	< 0.0001
Population	4	8.778	< 0.0001
Genotype	2	0.664	0.515
Year × Population	4	1.701	0.148
Year × Genotype	2	1.816	0.164
Population × Genotype	8	0.970	0.458
Year × Population × Genotype	8	0.670	0.718
Asn-2041 ACCase			
Year	1	478.650	< 0.0001
Population	2	70.869	< 0.0001
Genotype	2	0.761	0.467
Year × Population	2	56.568	< 0.0001
Year × Genotype	2	1.400	0.247
Population × Genotype	4	1.338	0.254
Year × Population × Genotype	4	0.530	0.714
Gly-2078 ACCase			
Year	1	259.531	< 0.0001
Population	1	3.849	0.0505
Genotype	2	0.393	0.676
Year × Population	1	20.028	< 0.0001
Year × Genotype	2	0.618	0.539
Population × Genotype	2	0.624	0.536
Year × Population × Genotype	2	0.319	0.727