

Table S1. Results of GLMs evaluating relationships between plant dispersion and each of two seed traits, seed mass and the presence of seed dispersal traits, for 23 native and 25 introduced grasslands species in Montana, USA. Dispersion was measured and analyzed at either the local scale as the proportion of plots occupied per site or at the broad scale as the proportion of sites occupied. For all models, $df = 1$ and 44.

	Seed Mass				Dispersal Structures			
	Local Scale		Broad Scale		Local Scale		Broad Scale	
	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>	<i>F</i>	<i>p</i>
Trait	1.7	0.1991	1.1	0.2948	2.1	0.1591	1.9	0.1723
Origin	<0.1	0.9198	0.1	0.7167	2.5	0.1208	0.8	0.3862
Trait x Origin	3.5	0.0673	2.0	0.1647	0.5	0.4922	0.6	0.4575

Table S2. Seed traits evaluated for 23 native (N) and 25 introduced (I) grassland plant species in Montana, USA, in order of their measured seed mass (averaged over the number of samples indicated in parentheses), which was used to divide seeds into small (S) and large (L) seed size classes for analysis based on a natural break in the data. Also given is the seed mass value obtained from the TRY trait database (averaged over the number of records indicated in parentheses); note that the database did not contain data for four species (indicated by a dash). Seed mass was compared between data sources using a one sample *t*-test.

Species	Origin	Seed Size	Disp. Struct.	Seed Measures				Comparison to TRY		
				Length (mm)	Width (mm)	SA (mm ²)	Mass (mg)	Mass (mg)	<i>t</i> [†]	<i>p</i>
<i>Lithophragma parviflorum</i>	N	S	None	0.48	0.27	0.10	0.012 (9)	–	–	–
<i>Draba verna</i>	I	S	None	0.42	0.28	0.10	0.016 (9)	–	–	–
<i>Filago arvensis</i>	I	S	Pappus	0.84	0.31	0.22	0.028 (9)	0.400 (1)	649.0	<0.0001
<i>Sisymbrium loeselii</i>	I	S	None	0.81	0.45	0.33	0.052 (9)	0.109 (5)	22.0	<0.0001
<i>Holosteum umbellatum</i>	I	S	None	0.71	0.51	0.32	0.065 (9)	0.115 (2)	28.7	<0.0001
<i>Arenaria serpyllifolia</i>	I	S	None	0.61	0.45	0.29	0.067 (9)	0.077 (16)	8.2	<0.0001
<i>Veronica verna</i>	I	S	None	0.90	0.64	0.89	0.070 (9)	0.108 (7)	21.6	<0.0001
<i>Achillea millefolium</i>	N	S	Wing	1.50	0.45	0.36	0.073 (9)	0.197 (26)	47.4	<0.0001
<i>Boechera retrofracta</i>	N	S	Wing	1.02	0.88	0.67	0.097 (9)	0.126 (4)	5.6	0.0005
<i>Hypericum perforatum</i>	I	S	None	1.09	0.45	0.45	0.098 (9)	0.277(17)	36.0	<0.0001
<i>Verbascum blattaria</i>	I	S	None	0.79	0.54	0.39	0.109 (9)	0.108 (3)	0.5	0.6246
<i>Linaria dalmatica</i>	I	S	None	1.47	0.95	1.04	0.134 (9)	0.140 (1)	0.8	0.4479
<i>Myosotis stricta</i>	I	S	None	1.03	0.64	0.52	0.147 (9)	0.113 (1)	5.0	0.0011
<i>Apera interrupta</i>	I	S	Awn	2.04	0.39	0.83	0.151 (9)	0.095 (2)	7.5	<0.0001
<i>Collinsia parviflora</i>	N	S	None	1.68	0.98	1.38	0.151 (9)	1.451 (7)	70.5	<0.0001
<i>Sisymbrium altissimum</i>	I	S	None	0.91	0.58	0.50	0.177 (12)	0.190 (9)	1.1	0.3005
<i>Potentilla recta</i>	I	S	None	1.12	0.79	0.73	0.198 (9)	0.229 (6)	4.0	0.0039
<i>Poa compressa</i>	I	S	None	2.37	0.63	1.30	0.231 (9)	0.219 (10)	1.2	0.2736
<i>Koeleria macrantha</i>	N	S	Awn	4.77	0.92	3.97	0.263 (9)	2.458 (15)	24.0	<0.0001
<i>Poa secunda</i>	N	S	None	3.83	0.76	2.37	0.317 (9)	0.325 (3)	0.0	0.9992
<i>Rumex acetosella</i>	I	S	None	1.54	0.96	1.04	0.333 (9)	0.695 (30)	18.3	<0.0001
<i>Arenaria congesta</i>	N	S	None	1.64	0.99	1.23	0.336 (9)	0.640 (1)	21.2	<0.0001
<i>Camelina microcarpa</i>	I	S	None	1.21	0.84	0.84	0.347 (9)	0.294 (5)	7.0	0.0001
<i>Festuca idahoensis</i>	N	S	Awn	5.57	0.81	4.63	0.441 (9)	1.037 (3)	36.0	<0.0001
<i>Taraxacum officinale</i>	I	S	Pappus	3.42	0.69	1.86	0.450 (9)	–	–	–

<i>Alyssum alyssoides</i>	I	S	None	1.56	1.18	1.53	0.561 (9)	0.690 (6)	7.9	<0.0001
<i>Lactuca serriola</i>	I	S	Pappus	3.40	0.80	1.96	0.572 (9)	0.464 (13)	3.6	0.0074
<i>Heterotheca villosa</i>	N	S	Pappus	2.81	0.87	1.23	0.693 (9)	0.769 (3)	1.9	0.0951
<i>Plantago patagonica</i>	N	S	None	2.01	1.00	1.67	0.734 (9)	0.542 (3)	3.9	0.0024
<i>Microsteris gracilis</i>	N	S	None	2.35	1.49	2.71	1.069 (9)	1.111 (7)	1.1	0.2965
<i>Geum triflorum</i>	N	S	Plume	2.79	0.84	1.19	1.291 (9)	0.949 (5)	11.7	<0.0001
<i>Zigadenus venenosus</i>	N	L	None	5.39	1.47	6.01	1.667 (9)	–	–	–
<i>Eriogonum umbellatum</i>	N	L	None	4.69	1.45	4.17	1.692 (9)	2.308 (6)	14.0	<0.0001
<i>Danthonia unispicata</i>	N	L	Awn	7.46	1.56	9.92	1.994 (9)	1.132 (1)	12.9	<0.0001
<i>Centaurea stoebe</i>	I	L	Pappus	2.91	1.32	4.11	2.001 (9)	2.058 (3)	1.1	0.2954
<i>Gaillardia aristata</i>	N	L	Pappus	2.80	1.56	2.20	2.044 (9)	22.532 (4)	215.4	<0.0001
<i>Fritillaria pudica</i>	N	L	None	5.55	4.44	17.95	2.297 (9)	2.336 (3)	0.4	0.727
<i>Erodium cicutarium</i>	I	L	Awn	4.32	1.01	5.51	2.499 (9)	1.985 (18)	14.3	<0.0001
<i>Euphorbia virgata</i>	I	L	None	2.28	1.53	2.94	2.909 (9)	2.876 (8)	1.4	<0.0001
<i>Bromus japonicus</i>	I	L	Awn	6.03	1.55	8.29	2.962 (12)	2.577 (5)	7.1	<0.0001
<i>Elymus spicatus</i>	N	L	Awn	8.40	1.13	4.73	3.662 (9)	4.040 (3)	9.7	<0.0001
<i>Bromus tectorum</i>	I	L	Awn	8.46	0.79	8.03	3.690 (12)	2.808 (19)	10.7	<0.0001
<i>Lomatium triternatum</i>	N	L	Wing	7.95	4.72	11.08	4.520 (9)	2365.908 (3)	205.0	<0.0001
<i>Balsamorhiza sagittata</i>	N	L	None	7.77	1.94	12.56	4.702 (9)	5.304 (4)	3.3	0.0115
<i>Tragopogon dubius</i>	I	L	Pappus	10.39	1.27	6.60	7.172 (9)	8.924 (10)	4.1	0.0036
<i>Stipa comata</i>	N	L	Awn	9.41	1.09	5.20	7.568 (9)	5.655 (6)	13.5	<0.0001
<i>Lupinus sericeus</i>	N	L	None	4.56	3.40	13.18	20.378 (12)	20.349 (2)	0.1	0.9647
<i>Lithospermum ruderales</i>	N	L	None	4.33	3.40	11.23	27.162 (12)	17.345 (3)	17.5	<0.0001

† df = 8 except in five cases (*B. japonicus*, *B. tectorum*, *Filago arvensis*, *L. ruderales*, and *L. sericeus*) where df = 11 (due to the extra sample weighed per population).

Supplemental Materials S1. Seed mass patterns obtained when original measures were replaced with estimates from the TRY trait database.

We repeated analyses involving seed mass while replacing our measured values of this trait with those obtained from the TRY trait database. Despite the fact that seed mass differed substantially between sources in many cases (see Results and Table S2), analyses revealed parallel patterns. Specifically, we once again saw a linkage among seed dispersal structures, species origin, and seed mass (now represented by estimates from the TRY database). The presence of seed dispersal structures tended to vary with both seed mass ($F_{1,40} = 4.9, p = 0.034$) and species origin (seed mass x origin: $F_{1,40} = 4.9, p = 0.033$). As seen in our original analysis, seed mass was positively correlated with the presence of dispersal structures for introduced and not native taxa. Similarly, 83% of 6 exotics with large seeds (> 1.5 mg) had dispersal structures compared to only 18% of 17 smaller-seeded exotics ($p = 0.009$), while the proportion of native species with these structures did not differ between large-seed (50% of 10 species) and small-seed (55% of 11 species) classes ($p = 1.0$). Origin significantly affected the presence of dispersal structures ($F_{1,40} = 4.5, p = 0.04$), but in alignment with original results, the pattern varied with seed mass as indicated by the significant interaction between origin and seed mass (test statistics above); introduced species were generally more likely than natives to have seed dispersal structures at large but not small seed masses.

Seed mass, as represented by estimates from the TRY trait database, was also associated with plant dispersion. Local-scale dispersion (proportion of plots occupied per site) again tended to correlate positively with seed mass for introduced but not native taxa, as supported by a marginally significant interaction between seed mass and origin ($F_{1,40} = 3.1, p = 0.089$). Consistent with the original analysis, the seed mass relationship did not vary significantly with origin when we considered broad-scale dispersion (proportion of sites occupied; $F_{1,40} = 2.5, p = 0.12$).