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Appendix 1–6

Appendix 1

Monthly average of air temperature and monthly precipitation sum in the two study regions during the three experimental years. Meteorological data were measured at site 1 (Bad Lauchstädt) in Germany and in the Pepperwood Preserve in California (Pepperwood weather station, Pepperwood Preserve). Long-term averages refer to 1984-2013 for the German sites (Bad Lauchstädt: Helmholtz Centre for Environmental Research - UFZ, Department of Soil Physics) and to 1971-2000 for the California sites (NCDC 1971-2000 Monthly Normals for Santa Rosa, CA: Western Regional Climate Center, <www.wrcc.dri.edu>, 04.12.2015).

Year / month	California		Germany	
	T [°C]	Precip. [mm]	T [°C]	Precip. [mm]
2011				
January	14.4	49	1.6	31.2
February	15.3	144.9	0.6	12.8
March	15.5	278.8	5.3	10.7
April	18.5	14.4	12.3	15.9
May	20	79	14.6	24.3
June	22.3	38.2	18	49.6
July	24	0.1	17.4	159.9
August	24.7	0	18.9	66.1
September	26.6	0	16.3	49.2
October	23.2	43.9	10.1	28.2
November	16.5	56.5	3.9	0.4
December	16.1	2.7	4.8	36.2
2012				
January	16.1	182.8	2.4	48.3
February	16.5	41.1	-2.8	16.1
March	15.3	194.2	7.8	5
April	18.8	45	9.1	12.3
May	22.8	3.4	15.2	53.2
June	23.9	0	16.3	91.7
July	25	0	18.9	45.1
August	25.5	0	19.4	54.2
September	25.1	0	15.2	21.4
October	23.8	56.8	9.5	10.3
November	18.1	206.8	5.6	52.9
December	13.1	242.7	2.1	43.2
2013				
January	13.8	24.4	0.5	39.8
February	16.4	13	-0.2	25.1
March	18.1	50.8	-1.1	34.8
April	22	28.6	9.1	34.4

May	23.9	0	13.1	123.5
June	25.1	0	16.8	58.6
July	24.4	0	20.5	25.8
August	26.1	0	19.2	35.1
September	27	0	14	64.7
October	24.6	0	11.3	53.6
November	20.7	0.4	5.1	59.8
December	16.2	12.5	4.5	22.7
Long-term average				
January	9.3	158.8	0.7	25.6
February	11.3	154.4	1.2	23.5
March	12.5	119.6	4.6	32.8
April	14.2	42.4	9.2	29.8
May	16.4	21.1	13.9	55.3
June	18.9	4.8	16.6	58.2
July	19.8	1.5	18.9	69
August	19.9	2.8	18.7	52.9
September	19.6	12.4	14.5	48.5
October	17.1	46	9.8	26.5
November	12.3	109.5	4.7	38
December	9.2	114.3	1.7	34.3
Annual	15.1	787.7	9.5	494.3

Appendix 2

Location, species richness and productivity of the grassland sites. Background species richness and productivity were determined in summer 2012. Background species richness includes those added species which were already present at a given site before the start of the experiment

Site	Longitude	Latitude	Elevation(m)	Background species richness [6 m^2]	Background productivity [g m^{-2}]
California					
1	38°56'74.03"N	122°68'68.53"W	317	35	54.0
2	38°56'71.78"N	122°68'77.65"W	320	30	170.0
3	38°56'96.21"N	122°68'81.87"W	366	29	378.1
4	38°57'43.86"N	122°69'25.41"W	418	46	47.5
5	38°57'89.81"N	122°71'42.34"W	326	51	484.4
6	38°58'36.76"N	122°70'72.66"W	372	51	204.8
7	37°86'18.24"N	122°27'13.87"W	184	56	136.3
8	38°60'53.62"N	122°74'03.11"W	137	36	236.0
Mean				**41.8**	**202.6**
Germany					
1	51°23'29.47"N	11°52'27.76"E	119	36	467.3
2	51°21'57.80"N	11°52'53.34"E	107	33	216.8
3	51°29'07.20"N	11°41'40.34"E	114	34	300.5
4	51°23'16.35"N	11°31'30.20"E	215	40	367.5
5	51°22'50.80"N	11°30'16.89"E	228	37	72.6
6	51°31'55.83"N	11°42'51.43"E	164	22	130.8
7	51°32'10.94"N	11°41'11.77"E	168	44	132.8
8	51°37'15.34"N	11°40'53.62"E	100	27	301.3
9	51°36'57.99"N	11°43'50.61"E	64	61	323.5
10	51°32'37.70"N	11°51'55.11"E	79	44	377.7
Mean				**37.8**	**269.1**

Appendix 3

Soil chemical and physical conditions of the experimental sites in California and Germany (mean values and ranges across the 8 and 10 grassland sites, respectively). At each site, 10 random soil samples were taken at a depth of 0-10 cm and subsequently pooled for analyses.

	California			Germany		
	Mean	Min.	Max.	Mean	Min.	Max.
Clay [%]	16.5	13.3	19.8	10.3	6.2	16.5
Silt [%]	60.9	56.9	64.3	73.7	66.2	80.9
Sand [%]	22.6	17.9	26.1	16.0	7.2	24.5
Gravel [%]	0.0	0.0	0.0	2.6	0.6	8.0
pH (in 1 mol/l KCl)	5.17	4.38	6.37	6.45	3.80	7.24
Carbonate [%]	0.00	0.00	0.00	3.93	0.00	14.60
Organic C [%]	2.48	1.32	3.20	2.55	1.64	3.38
Total N [%]	0.245	0.149	0.318	0.232	0.141	0.334
C/N ratio	9.99	8.83	10.87	10.99	10.12	11.97
Exchangable Mg [µmolc g^{-1}]	106.3	28.5	277.4	19.1	15.0	24.0
Exchangable Ca [µmolc g^{-1}]	314.1	256.4	379.3	289.3	97.9	424.1
Exchangable K [µmolc g^{-1}]	4.50	2.97	7.39	8.22	4.58	13.31
Plant available P [µg g^{-1}]	2.8	0.0	14.8	57.3	0.1	294.5

Appendix 4

Native and exotic species added to seed addition subplots (0.25 m^2) in Germany and California. Propagule mass differed between functional groups (legumes > grasses > non-legume herbs, $F_{2,62} = 3.60$, $p = 0.03$), but not between exotic and native species ($F_{1,62} = 1.03$, $p = 0.31$). Life span: P = perennial, A = annual, A-B = annual/biennial, A-P = annual/perennial. Functional groups: G = grass, L = legume, NL = non-legume herb.

	CALIFORNIA	**Life span**	**Functional group**	**Propagule mass [mg]**	**Seed number/ subplot**	**Seedmass/ subplot [g]**	**Census 1 (mean number of individuals/ subplot)**	**Census 2 (mean number of individuals/ subplot)**	**Census 3 (mean number of individuals/ subplot)**
Exotic species									
1	*Avena fatua*	A	G	12.96	50	0.65	4.62	5.28	8.22
2	*Brassica nigra*	A	NL	1.10	100	0.11	2.47	1.67	0.00
3	*Bromus hordeaceus*	A	G	2.21	100	0.22	13.04	20.48	65.50
4	*Cynosurus echinatus*	A	G	2.02	100	0.20	8.33	17.20	2.67
5	*Dactylis glomerata*	P	G	1.14	100	0.11	2.48	3.47	3.67
6	*Daucus carota*	P	NL	2.24	100	0.22	7.24	8.62	6.39
7	*Foeniculum vulgare*	P	NL	3.33	100	0.33	3.25	3.89	1.67
8	*Hypericum perforatum*	P	NL	0.07	175	0.01	5.00	5.00	4.00
9	*Hypochaeris radicata*	P	NL	0.48	175	0.08	5.33	4.44	4.25
10	*Lolium multiflorum*	A-B	G	1.58	100	0.16	45.48	30.88	42.43
11	*Petrorhagia dubia*	A	NL	0.22	100	0.02	0.67	8.27	32.60
12	*Plantago lanceolata*	P	NL	1.29	175	0.23	0.67	0.89	1.22
13	*Raphanus sativus*	A-B	NL	11.34	100	1.13	4.00	4.00	0.89
14	*Rumex crispus*	P	NL	3.61	50	0.18	0.80	1.67	0.00
15	*Trifolium hirtum*	A	L	6.93	100	0.69	0.87	1.00	5.24
16	*Trifolium repens*	A	L	1.43	100	0.14	0.00	0.00	0.00
17	*Vicia villosa**	A	L	19.42	25	0.49	2.00	2.00	0.62
Native species									
1	*Agoseris grandiflora*	P	NL	1.20	100	0.12	4.60	1.50	0.33
2	*Clarkia purpureum*	A	NL	0.79	175	0.14	6.94	3.89	3.67
3	*Danthonia californica*	P	G	3.83	100	0.38	5.11	5.71	5.13
4	*Elymus glaucus*	P	G	4.31	175	0.75	2.33	0.00	0.56
5	*Eremocarpus setigerus*	A	NL	8.18	100	0.82	4.90	8.71	0.00
6	*Eriogonum luteolum*	A	NL	0.41	100	0.04	11.67	8.78	58.25

7	*Festuca californa*	P	G	1.35	175	0.24	0.00	0.00	0.00
8	*Eschscholzia californica*	A	NL	1.39	100	0.14	4.08	2.10	0.33
9	*Hemizonia congesta*	A	NL	8.89	100	0.89	0.00	6.05	20.12
10	*Hordeum brachyantherum*	P	G	3.10	100	0.31	5.48	0.67	12.13
11	*Lotus purshianus*	A	L	3.23	100	0.32	0.00	2.29	2.53
12	*Lupinus nanus*	A	L	10.82	100	1.08	3.67	2.33	4.60
13	*Mimulus guttatus*	A	NL	0.03	100	0.00	2.56	10.00	0.00
14	*Stipa pulchra*	P	G	9.97	100	1.00	0.00	2.94	1.67
15	*Plantago erecta*	A	NL	2.10	100	0.21	4.67	1.72	3.17
16	*Sisyrinchium bellum*	P	NL	2.56	50	0.13	2.33	2.56	2.08
17	*Trifolium wildenowii*	A	L	1.64	100	0.16	4.33	2.11	2.09
	GERMANY								
Exotic species									
1	*Artemisia absinthium*	P	NL	0.08	175	0.01	0.67	1.52	1.47
2	*Bromus tectorum*	A	G	6.13	100	0.61	26.37	16.83	12.23
3	*Bunias orientalis*	P	NL	39.37	50	1.97	0.00	0.00	0.33
4	*Cardaria drabra*	P	NL	1.50	100	0.15	14.73	10.11	3.00
5	*Cichorium intybus*	P	NL	1.41	100	0.14	7.03	6.10	3.57
6	*Dianthus giganteus*	P	NL	1.23	100	0.12	9.80	6.10	7.10
7	*Diplotaxis tenuifolia*	P	NL	0.31	175	0.05	5.42	6.83	6.40
8	*Dipsacus sylvestris*	B	NL	3.24	100	0.32	3.08	4.17	2.24
9	*Echinops sphaerocephalus*	B	NL	13.98	50	0.70	0.33	0.67	0.67
10	*Foeniculum vulgare*	B-P	NL	5.58	100	0.56	1.33	4.70	1.56
11	*Lolium multiflorum*	B-P	G	7.60	100	0.76	18.53	15.00	5.11
12	*Medicago x varia*	P	L	1.87	100	0.19	0.20	2.70	3.65
13	*Melilotus officinalis*	A-B	L	2.54	100	0.25	0.44	2.27	1.39
14	*Onobrychis viciifolia*	P	L	20.10	50	1.00	7.67	5.27	3.95
15	*Pimpinella peregrina*	P	NL	3.01	175	0.53	0.75	2.30	3.63
16	*Sanguisorba minor ssp. Polygama*	P	NL	13.34	50	0.67	13.23	11.47	8.00
17	*Senecio inaequidens*	P	NL	0.28	175	0.05	1.83	4.07	3.41
18	*Sisymbrium loeseli*	A	NL	0.09	175	0.02	0.00	1.63	1.33
19	*Solidago canadensis*	P	NL	0.04	175	0.01	1.00	0.33	0.67
20	*Vicia villosa**	A	L	39.11	25	0.98	2.43	2.90	1.73
Native species									
1	*Agrimonia eupatoria*	P	NL	26.20	50	1.31	0.00	1.40	4.33
2	*Bromus hordeaceus*	A	G	2.35	100	0.24	13.70	13.97	13.23
3	*Cynoglossum officinale*	B	NL	28.01	50	1.40	1.60	2.27	3.93
4	*Dactylis glomerata*	P	G	0.64	175	0.11	4.60	6.07	7.83

5	*Daucus carota*	P	NL	0.87	175	0.15	0.93	1.73	3.34
6	*Dianthus carthusianorum*	P	NL	0.45	175	0.08	8.10	7.00	9.77
7	*Falcaria vulgaris*	P	NL	1.14	100	0.11	5.60	3.40	2.00
8	*Hypericum perforatum*	P	NL	0.11	175	0.02	0.00	2.08	1.87
9	*Hypochaeris radicata*	P	NL	0.62	175	0.11	3.29	6.30	5.48
10	*Lactuca serriola*	A	NL	0.46	175	0.08	0.89	0.63	1.37
11	*Lotus corniculatus*	P	L	0.96	175	0.17	0.79	1.20	0.00
12	*Medicago falcata*	P	L	0.92	175	0.16	0.00	0.61	2.37
13	*Pimpinella saxifraga*	B-P	NL	0.62	175	0.11	8.93	10.50	6.37
14	*Rumex crispus*	P	NL	2.72	100	0.27	1.08	0.58	0.67
15	*Salvia pratensis*	B-P	NL	1.26	100	0.13	0.25	0.58	0.54
16	*Sanguisorba minor*	P	NL	7.91	100	0.79	9.97	10.17	7.43
17	*Securigera varia*	P	L	6.05	100	0.60	0.53	0.67	2.52
18	*Silene vulgaris*	P	NL	0.62	175	0.11	4.66	11.67	9.03
19	*Tragopogon dubius*	B	NL	6.52	100	0.65	14.63	9.07	2.75
20	*Vicia tetrasperma*	A	L	3.40	100	0.34	0.33	0.44	2.93

*Due to infestation by beetle larvae we had to reduce the number of *Vicia villosa* seeds added (25 seeds instead of 50).

Appendix 5

(a) Estimates of rodent and gastropod abundance at 10 German and 8 Californian grassland sites. Mean, minimum and maximum number of burrows, holes and runways along 20-metre transects and b) mean, minimum and maximum number of slug and snail individuals per 0.12 m^2 sample area are given (averaged across 5 samples per site).

a)

	Germany			California		
Rodents	Mean	Min	Max	Mean	Min	Max
Burrow	1.35	0.5	3.5	2.69	1	4
Hole	3.25	0.5	9	7.44	3.5	16
Runways	19.35	1	32	14.38	5	31

b)

Germany		Mean [no. per 0.12 m^2]	Min [no. per 0.12 m^2]	Max [no. per 0.12 m^2]
Arion vulgaris	slug	0.72	0.20	4.80
Deroceras spp.	slug	1.16	0.40	8.40
	Σ	1.88	0.60	13.20
Cernuella neglecta	snail	0.04	0.00	0.40
Cochlicopa lubrica	snail	0.12	0.20	1.00
Helix pomatia	snail	0.08	0.20	0.40
Monacha cartusiana	snail	3.14	0.20	10.80
Succinea puris	snail	0.02	0.00	0.20
Cepea spp. (juvenile)	snail	0.02	0.00	0.20
	Σ	3.42	0.60	13.00
California				
Deroceras reticulatum	slug	1.13	0.60	2.60
Milax spp. (juvenile)	slug	0.08	0.20	0.40
	Σ	1.21	0.80	3.00

Appendix 6

Results of a generalized linear mixed model, testing for the effects of region (CA= California, GE = Germany) and exclosure (CON = Ccontrol without herbivore exclusion, EXC = herbivore exclosure, GAS = gastropod exclosure, ROD= rodent exclosure) on the proportion of recruited individuals relative to the number of seeds sown (census 1 = seedling emergence, census 2 = first-year establishment, census 3 = second-year establishment) of the six species shared among the two regions. *F* values and degrees of freedom are given (+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$).

		Census 1	Census 2	Census 3
Fixed effects	DF	F	F	F
Region (REG)	1,4	0.11	0.01	0.06
Exclosure (EXC)	2,8	0.40	0.03	0.48
REG × EXC	2,8	0.02	0.02	0.25