

Appendix A. Floristic composition and complementary results.

Table A1. Atlantic semi-natural grasslands of Aralar Natural Park, Basque Country, Northern Iberian Peninsula. Summary of the species found in 60 1 m²-quadrats (15 quadrats per field plot). Mean cover (%) of each species in each field plot is given. The most abundant (structural) species that have been used to trait analysis are shaded. Nomenclature follows Flora Iberica (Castroviejo 1986–2015) or Flora Europaea (Tutin *et al.*, 1964–1980 (only for Asteraceae and Poaceae species). G: Grazing, E: Exclusion.

Species	Family	Mean % Cover			
		Alotza		Uzkuiti	
		G	E	G	E
<i>Achillea millefolium</i> L.	Asteraceae	–	2	1	+
<i>Agrostis capillaris</i> L.	Poaceae	24	36	14	19
<i>Bellis perennis</i> L.	Asteraceae	+	–	+	–
<i>Campanula scheuchzeri</i> Vill.	Campanulaceae	1	1	+	+
<i>Carex caryophyllea</i> Latourr.	Cyperaceae	–	+	+	2
<i>Carex flacca</i> Schreb.	Cyperaceae	–	–	1	–
<i>Cerastium fontanum</i> Baumg.	Caryophyllaceae	2	1	2	+
<i>Crocus nudiflorus</i> Sm.	Iridaceae	1	2	5	4
<i>Danthonia decumbens</i> (L.) DC.	Poaceae	–	–	+	+
<i>Deschampsia flexuosa</i> (L.) Trin.	Poaceae	–	1	–	–
<i>Festuca nigrescens</i> subsp. <i>microphylla</i> (St-Yves) Markgr.-Dannenb.	Poaceae	29	30	36	34
<i>Galium saxatile</i> L.	Rubiaceae	11	11	7	17
<i>Hieracium pilosella</i> L.	Asteraceae	+	–	1	–

<i>Jasione laevis</i> Lam.	Campanulaceae	2	–	1	+
<i>Lotus corniculatus</i> L.	Fabaceae	1	1	1	+
<i>Luzula campestris</i> (L.) DC. in Lam. & DC.	Juncaceae	10	10	11	10
<i>Poa annua</i> L.	Poaceae	1	+	–	1
<i>Polygala serpyllifolia</i> Hosé	Polygalaceae	2	–	1	+
<i>Potentilla erecta</i> (L.) Raeusch.	Rosaceae	1	2	1	7
<i>Potentilla montana</i> Brot.	Rosaceae	+	+	+	1
<i>Potentilla sterilis</i> (L.) Garcke	Rosaceae	+	–	2	–
<i>Ranunculus bulbosus</i> L.	Ranunculaceae	–	–	+	–
<i>Scilla verna</i> Huds.	Liliaceae	–	–	+	–
<i>Trifolium repens</i> L.	Fabaceae	14	2	14	4
<i>Veronica serpyllifolia</i> L.	Plantaginaceae	1	+	1	+

Table A2. Permutation test of distance-based redundancy analysis (dbRDA). The null hypothesis of no effect of grazing abandonment on structural species composition is tested. Number of permutations: 1000.

	Df	Variance	<i>F</i>	<i>p</i>
Site	1	0.636	5.621	0.001
Treatment	1	1.108	9.794	0.001
Residual	57	6.447		
R ² -adj:	0.19			

Table A3. Results of the two-way ANOVAs for intraspecific variability of plant traits. The null hypothesis of no effect of grazing abandonment on ITV of the five structural species was tested. A separate ANOVA was performed for each species and each trait, using the fixed factors Site (Alotza and Uzkuiti), Treatment (Grazing and Exclusion) and their interaction as explanatory variables. Some response variables were log transformed to normalize the distributions. Significant *p*-values at the 0.05 level are in bold.

A) Vegetative height (cm)

	Df	<i>Festuca microphylla</i>				<i>Agrostis capillaris</i>				<i>Galium saxatile</i>				<i>Luzula campestris</i>				<i>Trifolium repens</i>			
		SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>
Site	1	1540.6	1540.6	175.39	0.00	6.87	6.87	140.08	0.00	6.26	6.26	60.62	0.00	5.05	5.05	56.2	0.00	1.36	1.36	9.82	0.00
Treatment	1	2636.8	2636.8	300.19	0.00	14.28	14.28	291.34	0.00	10.64	10.64	103.05	0.00	10.17	10.17	113.11	0.00	3.19	3.19	23	0.00
Site × Treat	1	504	504	57.38	0.00	0.08	0.08	1.57	0.21	0.34	0.34	3.26	0.07	0.34	0.34	3.73	0.06	0.19	0.19	1.38	0.24
Residual	96	843.24	8.78			4.71	0.05			9.91	0.1			8.63	0.09			13.32	0.14		

B) Specific leaf area (m² kg⁻¹)

	Df	<i>Festuca microphylla</i>				<i>Agrostis capillaris</i>				<i>Galium saxatile</i>				<i>Luzula campestris</i>				<i>Trifolium repens</i>			
		SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>
Site	1	0.04	0.04	0.02	0.88	8.96	8.96	0.37	0.55	90.22	90.22	3.26	0.08	63.87	63.87	15.84	0.00	0.06	0.06	2.65	0.12
Treatment	1	18.52	18.52	0.00	0.00	508.81	508.81	21.25	0.00	717.1	717.1	25.95	0.00	490.31	490.31	121.61	0.00	0.11	0.11	5.08	0.03
Site × Treat	1	0.74	0.74	0.54	0.54	21.89	21.89	0.91	0.35	147.2	147.2	5.33	0.03	316.04	316.04	78.38	0.00	0.01	0.01	0.63	0.43
Residual	24	45.25	1.89			574.74	23.95			663.24	27.63			96.77	4.03			0.51	0.02		

C) Leaf N content (mg g⁻¹)

	Df	<i>Festuca microphylla</i>				<i>Agrostis capillaris</i>				<i>Galium saxatile</i>				<i>Luzula campestris</i>				<i>Trifolium repens</i>			
		SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>
Site	1	16.97	16.97	2.71	0.11	0.23	0.23	16.96	0.00	70.72	2768.1	10.12	0.00	213.96	213.96	63.06	0.00	569.7	569.7	21.95	0.00
Treatment	1	1.37	1.37	0.22	0.64	0.49	0.49	36.55	0.00	2.01	79.6	0.29	0.6	82.29	82.29	24.25	0.00	10.69	10.69	0.41	0.52
Site × Treat	1	27.21	27.21	4.34	0.05	0.00	0.00	0.07	0.8	195.04	7609.8	27.91	0.00	5.85	5.85	1.72	0.2	5.76	5.76	0.22	0.64
Residual	24	150.53	6.27			0.32	0.01			167.73	6.99			81.43	3.39			622.86	25.95		

D) Leaf C to N ratio

	Df	<i>Festuca microphylla</i>				<i>Agrostis capillaris</i>				<i>Galium saxatile</i>				<i>Luzula campestris</i>				<i>Trifolium repens</i>			
		SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>	SS	MS	<i>F</i>	<i>p</i>
Site	1	102.22	102.22	4.04	0.06	147.66	147.66	19.5	0.00	0.16	0.16	11.7	0.00	1.05	1.05	75.75	0.00	0.38	0.38	15.25	0.00
Treatment	1	29.42	29.42	1.16	0.29	301.63	301.63	49.9	0.00	0.01	0.01	0.68	0.42	0.41	0.41	29.12	0.00	0.00	0.00	0.02	0.89
Site × Treat	1	121.39	121.39	5	0.04	0.22	0.22	0.03	0.87	0.4	0.4	29.82	0.00	0.05	0.05	3.75	0.06	0.02	0.02	0.67	0.42
Residual	24	607.36	25.31			181.55	7.57			0.32	0.01			0.33	0.01			0.6	0.02		

Table A4. Results of two-way ANOVAs for “Fixed”, “Specific”, and “Intraspecific” CWMs of plant traits. The null hypothesis of no effect of grazing abandonment on CWMs was tested. A separate ANOVA was performed for each trait and type of CWM, using the fixed factors Site (Alotza and Uzkuiti), Treatment (Grazing and Exclusion) and their interaction as explanatory variables. Significant *p*-values at the 0.05 level are in bold.

A) Vegetative height (cm)

	Fixed					Specific					Intraspecific variability				
	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>
Site	1	1.17	1.17	3.03	0.087	1	553.97	553.97	1559.21	0.000	1	605.97	605.97	7532.8	0.000
Treatment	1	6.07	6.07	15.77	0.000	1	1228.03	1228.03	3456.43	0.000	1	1061.49	1061.49	13195.3	0.000
Site × Treatment	1	2.95	2.95	7.66	0.008	1	128.64	128.64	362.08	0.000	1	170.52	170.52	2119.8	0.000
Residual	56	21.54	0.38			56	19.9	0.36			56	4.5	0.08		

B) Specific leaf area (m² kg⁻¹)

	Fixed					Specific					Intraspecific variability				
	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>
Site	1	4.91	4.91	1.05	0.31	1	16.48	16.48	3	0.089	1	3.4	3.4	7.75	0.01
Treatment	1	0.3	0.3	0.06	0.8	1	463.81	463.81	84.55	0.000	1	487.71	487.71	1112.17	0.000
Site × Treatment	1	26.27	26.27	5.62	0.021	1	7.26	7.26	1.33	0.254	1	61.18	61.18	139.52	0.000
Residual	56	261.56	4.67			56	307.2	5.49			56	24.56	0.44		

C) Leaf N content (mg g⁻¹)

	Fixed					Specific					Intraspecific variability				
	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>
Site	1	0.08	0.08	0.04	0.836	1	21.26	21.26	9.88	0.003	1	18.67	18.67	55.17	0.000
Treatment	1	38.7	38.7	20.15	0.000	1	200.42	200.42	93.14	0.000	1	62.98	62.98	186.02	0.000
Site × Treatment	1	8.08	8.08	4.2	0.045	1	2.37	2.37	1.1	0.299	1	1.7	1.7	5.02	0.029
Residual	56	107.57	1.92			56	120.5	2.15			56	18.96	0.34		

D) Leaf C to N ratio

	Fixed					Specific					Intraspecific variability				
	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>	Df	SS	MS	<i>F</i>	<i>p</i>
Site	1	1.66	1.66	0.76	0.386	1	6.74	6.74	2.76	0.102	1	15.1	15.1	26.91	0.000
Treatment	1	15.09	15.09	6.91	0.011	1	327.44	327.44	134.11	0.000	1	201.93	201.93	359.94	0.000
Site × Treatment	1	6.49	6.49	2.97	0.09	1	30.25	30.25	12.39	0.000	1	8.72	8.72	15.54	0.000
Residual	56	122.29	2.18			56	136.63	2.42			56	31.42	0.56		

References

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