

Schulze et al.: Epizoochory European Bison

Appendix S1. Summary of the results of seed species which were recorded in the hoof material of European bison, and of the non-dispersed species in the enclosure. The data of seed mass, seed production, longevity, trampling and epizoochory were derived from different databases (LEDA-traitbase, Bioflor, Dispersal Diaspore Database). Mean seed mass of dispersed seed species was measured and compared to the results from HINTZE et al. (2013). Species which were dispersed endozoochorously by the four bisons during the study period (K.A. Schulze, unpubl. data) in bold. Abbreviations for the biotope types mean: fg = fertilized- and ng = nutrient-poor grassland / coastal heath; rs = ruderal site; sf = scrub and forest; ts = trampled site; wh = wet heath.

Anhang S1. Zusammenfassung der Ergebnisse der Samenarten, die in den Klauen-Proben festgestellt wurden, und der nicht ausgebreiteten Arten im Gehege. Die Daten zu Gewicht, Samenproduktion, Lebensdauer, Trittresistenz, „Epizoochory Ranking Index“ (Skalierung der Bedeutung von Epizoochorie im Fell für eine Pflanzenart) wurden mithilfe unterschiedlicher Datenbanken ermittelt (s. o.). Das gemessene Samengewicht wurde mit den durchschnittlichen Messwerten von HINTZE et al. (2013) verglichen. Arten, die von den vier Wisenten in der gleichen Untersuchungszeit endozoochor ausgebreitet wurden (K.A. Schulze, unpubl. Daten) in Fettdruck. Bedeutung der Abkürzungen der Biotoptypen sind: fg = Wirtschaftsgrünland, ng = Magerrasen / Küstenheide; rs = Ruderalflur; sf = Gebüsch und Wald; ts = Trittrasen; wh = Feuchte Heide.

Plant species	Cover (%) vegetation (n = 95) area 46 ha	Total no. seeds in hooves (n = 1082)	Sample date (month)	Seed shedding (month)	Biotope type	Mean seed mass (mg)	Mean seeds per shoot	Seed longevity index	Mean release height (m)	Trampling resistance index	Epizoochory Ranking Index
<u>Dispersed species</u>											
<i>Agrostis capillaris</i>	3.3	183	7–8	1–12	fg	0.06	192.5	0.52	0.52	5	
<i>Alnus glutinosa</i>	0.2	2	5, 8	6–11	sf	1.19		0.44	17.5		0.18
<i>Amaranthus retroflexus</i>	0.2	1	7	8–10	rs	0.30	3745.5	0.79	0.57		0.26
<i>Betula pendula</i>	1.1	47	5–8	8–10	sf	0.13	10 ⁷	0.75	17.5		0.74
<i>Betula pubescens</i>	0.2	43	5–8	8–10	sf	0.14	10 ⁷	0.49	17.5		0.56
<i>Carex pilulifera</i>	0.5	1	7	6–8	ng	1.17	108	0.83	0.25	4	0.65
<i>Carex spec.</i>	0.0	1	7								
<i>Crataegus monogyna</i>	0.3	1	5	9–11	sf	280		0.03	6.25	9	0.02
<i>Crepis capillaris</i>	0.1	1	7	6–10	fg	0.26	8·10 ³	0.08	0.38	5	
<i>Deschampsia flexuosa</i>	0.1	11	6–8	6–11	ng	0.68	275.5		0.53	4	
<i>Erica tetralix</i>	0.1	4	6	9–11	wh	0.01	78878	0.48	0.32	4	0.53
<i>Festuca ovina</i>	0.5	11	6–8	6–9	ng	0.48	847		0.395	4	
<i>Festuca pratensis</i>	0.1	7	7–8	6–10	fg	2.09		0.43	0.7	6	0.14
<i>Holcus lanatus</i>	0.5	5	7–8	6–11	fg	0.39	177·10 ⁵	0.51	0.6	4	0.83
<i>Juncus tenuis</i>	0.5	41	7	8–11	ts	0.02		0.97	0.33	9	
<i>Larix kaempferi</i>	12.6	7	5–8	9–3	sf				25		
<i>Leontodon autumnalis</i>	0.5	1	8	6–11	fg	0.80	821.5	0.11	0.26	7	0.95
<i>Molinia caerulea</i>	3.3	2	8	9–12	ng	0.81	1120	0.29	1	3	0.28
<i>Persicaria hydropiper</i>	0.2	4	5–6	8–11	ts	2.60	500	0.4	0.43	2	0.15
<i>Persicaria minor</i>	0.2	3	8	9–11	ts	1.10	122		0.25		0.22
<i>Picea abies</i>	3.2	11	5–8	9–3	sf	6.50	80374.5	0.08	35		0.06
<i>Plantago major</i> ssp. <i>major</i>	0.7	1	7	3–12	ts	0.26	10059	0.65	0.23	9	0.30
<i>Plantago media</i>	0.5	1	8	6–12	ng	0.32	960	0.29	0.43	8	0.29
<i>Poa annua</i>	1.5	32	6–8	1–12	ts	0.30	1000	0.83	0.16	9	0.82
<i>Polygonum aviculare</i> agg.	0.5	607	5–8	6–12	ts	2.07	162.5	0.57	0.28	9	0.20
<i>Rumex acetosella</i>	0.5	12	6–8	6–10	ng	0.36	1000	0.7	0.32	4	0.69

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<i>Rumex crispus</i>	0.1	10	7–8	6–11	fg	0.94	3711	0.3	8.15	3	0.28
<i>Senecio inaequidens</i>	0.5	17	7	7–12	rs	0.25	8270		0.65		
<i>Senecio spec.</i>	0.0	6	7		rs						
<i>Stellaria graminea</i>	0.2	1	5	7–9	sf	0.30		0.28		5	0.33
<i>Stellaria media</i>	1.5	6	8	10–5	rs	0.48	15·10 ⁴	0.71	0.23	4	0.34
<i>Trifolium dubium</i>	0.1	2	6–7	6–11	rs	0.36	92	0.33	0.2	4	
<u>Non-dispersed species</u>											
<i>Achillea millefolium</i>	0.1			6–12	fg	0.13	2662.5	0.1	0.7	5	0.63
<i>Anthoxanthum odoratum</i>	0.5			6–8	ng	0.20	230.5	0.28	0.45	5	0.85
<i>Bromus hordeaceus</i>	0.1			3–8	rs	3.48	285	0.13	0.43	5	0.54
<i>Calluna vulgaris</i>	3.3			1–12	wh	0.04		0.81	0.59		0.44
<i>Capsella bursa-pastoris</i>	0.1			5–11	rs	0.13	21·10 ⁴	0.65	0.36	6	0.68
<i>Carex lasiocarpa</i>	0.1			8–10	ng	0.58	47.5	0.25	0.65		0.89
<i>Centaurea cyanus</i>	0.1			7–11	fg	4.5	1150	0.6	0.65		0.73
<i>Cerastium holosteoides</i>	0.5			5–10	fg	0.10	400	0.36	0.18	4	0.42
<i>Cirsium arvense</i>	0.5			7–12	rs	1.06	50·10 ³	0.2	0.9	2	0.91
<i>Conyza canadensis</i>	0.5			7–12	rs	0.05	11·10 ⁵	0.5	0.6	2	0.94
<i>Dactylis glomerata</i>	0.1			1–12	fg	0.99	295	0.14	0.96	6	0.73
<i>Danthonia decumbens</i>	0.1			7–10	ng	0.84	111	0	0.3	4	0.76
<i>Drosera intermedia</i>	0.5			9–11	wh	0.02	535	0.5	0.09		0.45
<i>Empetrum nigrum</i>	3.3			9–12	ng		149.35	0	0.24		
<i>Eriophorum angustifolium</i>	0.1			6–8	wh	0.54		0.08	0.4		1.00
<i>Euphorbia cyparissias</i>	0.1			5–9	ng	2.51		0.19	0.23		
<i>Fallopia convolvulus</i>	0.1			6–12	rs	5.00	600	0	1.0		0.08
<i>Festuca rubra</i>	6.0			7–9	fg	1.30	465	0	0.56	6	0.63
<i>Galeopsis tetrahit</i>	0.1			8–10	rs	3.19	493.5	0.02	0.43	3	0.64
<i>Galium aparine</i>	0.1			6–12	rs	8.34	350	0	1.3	1	0.92
<i>Galium saxatile</i>	1.1			8–11	ng	0.53		0	0.15	7	
<i>Geranium molle</i>	0.1			6–10	fg	1.15	90.5	0.06	0.2	7	0.45
<i>Hieracium lachenalii</i>	0.3			6–8	fs	0.44	533	0			
<i>Hieracium pilosella</i>	3.3			6–10	ng	0.16	48.3	0.15	0.2	7	0.98
<i>Hydrocotyle vulgaris</i>	0.1			8–10	wh	0.29	327.5	0.45	0.55	3	0.86
<i>Hypericum maculatum</i>	0.2			9–10	ng	0.02	4160	0.52	0.4	3	0.46
<i>Hypericum perforatum</i>	0.5			1–12	rs	0.10	23350	0.64	0.6	4	0.36
<i>Hypochaeris radicata</i>	0.7			6–11	ng	0.74	925	0.17	0.38	8	0.94
<i>Juncus bulbosus</i>	0.5			8–10	wh	0.03		0.91	0.17		0.69
<i>Juncus conglomeratus</i>	0.5			6–11	fg	0.02	6156·10 ⁵	0.47	0.6	6	0.72
<i>Juncus effusus</i>	0.5			6–8	fg	0.01	2116955	0.93	0.9	6	0.72

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<i>Lathyrus hirsutus</i>	0.1				fg	32.4			0.65		0.05
<i>Linaria vulgaris</i>	0.1			8–12	rs	0.13	20193	0.25	0.48		0.22
<i>Lonicera periclymenum</i>	0.7			6–11	sf	7.54		0.04	3.5		
<i>Lotus corniculatus</i>	0.1			6–11	ng	1.25	641	0.15	0.88	4	0.19
<i>Luzula campestris</i>	0.1			6–8	ng	0.59	236.5	0.4	0.33	5	0.53
<i>Menyanthes trifoliata</i>	0.1			6–9	wh	2.15	48.45	0	0.23		0.34
<i>Myosotis arvensis</i>	0.1			5–10	fg	0.3	850	0.44	0.25	3	0.78
<i>Picea sitchensis</i>	0.3			8–10	sf	2.90			60		
<i>Plantago lanceolata</i>	0.5			6–12	fg	1.65	15000	0.24	0.68	6	0.18
<i>Poa pratensis</i>	0.3			6–9	fg	0.22	208	0.38	0.55	8	0.77
<i>Poa trivialis</i>	0.1			6–8	fg	0.17	299.5	0.59		6	0.79
<i>Potentilla palustris</i>	0.1			8–10	wh	0.27		0.07	0.65	3	0.57
<i>Prunus serotina</i>	37.4			6–7	sf			0.33	25		
<i>Quercus robur</i>	0.1			9–11	sf	2500	5·10 ⁴	0	40		0.00
<i>Ranunculus repens</i>	0.1			6–9	fg	1.82	104.95	0.54	0.43	7	0.75
<i>Rhynchospora alba</i>	0.1			8–10	wh	0.43	1933.5	0.5	0.28		0.86
<i>Rosa glauca</i>	0.3			8–10	sf	18.94	2070		1.75		0.24
<i>Rubus fruticosus</i> agg.	0.3			9–11	sf	2.50		0.55	1.5		
<i>Senecio vulgaris</i>	0.1			3–12	fg	0.23	2713.5	0.55	0.2	3	0.97
<i>Sorbus aucuparia</i>	0.2			6–9	sf	360	24750	0.02	10.25		0.02
<i>Spergula arvensis</i>	0.5			7–12	rs	0.38	32·10 ³	0.87	0.3	9	0.13
<i>Tanacetum vulgare</i>	0.1			8–10	rs	0.11	7133	0.16	0.9	2	0.26
<i>Taraxacum officinale</i>	0.3			5–9	fg	0.61	2381	0.26	0.53	7	1.00
<i>Trichophorum germanicum</i>	0.1			6–8	wh		1200	0.08	0.25		
<i>Trifolium campestre</i>	0.1			7–10	ng	0.46	142.5	0.2	0.23		0.83
<i>Trifolium repens</i>	0.1			6–11	fg	0.59	200	0.38	0.33	8	0.23
<i>Urtica dioica</i>	0.3			6–11	rs	0.19	806.15	0.65	0.9	2	
<i>Veronica chamaedrys</i>	0.1			7–10	fg	0.22	26.8	0.42	0.28	6	0.17
<i>Veronica officinalis</i>	0.1			6–12	ng	0.11	217.5	0.63	0.23	4	0.34
<i>Veronica serpyllifolia</i>	0.1			5–8	fg	0.07	1021	0.71	0.15	7	0.40
<i>Vicia angustifolia</i>	0.1				rs	11.74	100	0	0.53	1	0.08
<i>Vicia tetrasperma</i>	0.1			6–10	fg	3.6	320	0.2	0.38		0.12