APPENDIX – PAPER 1

(SIMULATION OF SEED DIGESTION BY BIRDS: HOW DOES IT REFLECT THE REAL PASSAGE THROUGH A PIGEON'S GUT?)

Electronic Supplementary Material

Table S1 Measured values of seed parameters (Mean±S.E.) of 20 species

Species	**Seed coat thickness (mm)**	**Water permeability (%)**	**Seed weight (g)**	**Seed volume (mm^3)**
Andryala pinnatifida	0.027±0.004	3.2±0.1	0.001±0.000	0.067 ±0.003
Brachypodium arbuscula	0.102±0.003	6.1±0.5	0.023±0.001	4.940±0.338
Carex canariensis	0.084±0.002	6.1±0.4	0.006±0.000	1.838±0.110
Cistus monspelliensis	0.056±0.003	0.7±0.2	0.005±0.000	0.211±0.016
Crambe strigosa	0.192±0.002	7.6±0.4	0.012±0.000	1.987±0.122
Descurainia artemisioides	0.038±0.001	7.9±0.2	0.004±0.000	0.167±0.014
Echium plantagineum	0.091±0.003	3.7±0.9	0.014±0.002	1.244±0.098
Hypericum canariense	0.093±0.004	4.5±0.7	0.001±0.000	0.501±0.034
Lavatera cretica	0.198±0.004	9.3±0.8	0.035±0.001	2.062±0.045
Limonium pectinatum	0.098±0.004	3.0±0.8	0.001±0.000	0.233±0.014
Lotus arinagensis	0.049±0.006	0.9±0.3	0.005±0.000	0.759±0.017
Melica minuta ssp.*latifolia*	0.014±0.001	4.2±0.1	0.006±0.000	1.868±0.118
Plantago arborescens	0.034±0.002	16.2±0.2	0.014±0.000	0.436±0.026
Plantago lagopus	0.019±0.008	13.4±0.1	0.003±0.000	0.151±0.006
Reichardia ligularis	0.222±0.004	10.5±1.3	0.003±0.000	2.222±0.125
Reseda luteola	0.031±0.002	2.1±0.2	0.002±0.000	0.232±0.011
Rumex vesicarius	0.023±0.001	7.9±0.2	0.019±0.000	1.702±0.089
Salvia canariensis	0.112±0.000	19.0±0.7	0.010±0.001	0.752±0.036

Sideritis discolor	0.086±0.004	5.3±0.5	0.004±0.000	0.438±0.018
Sonchus regis-jubae	0.019±0.001	4.4±0.1	0.002±0.000	0.061±0.004

1 **Table S2** Differences in seed viability of 20 species among 7 types of simulation, digestion and control viability, in the first column of digestion
2 are numbers of seeds retrieved from pigeon feces (all retrieved seeds)
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Species	**Type of simulation**							**Digestion**		**Control**
	2/5	**2/30**	**2/120**	**12/5**	**12/30**	**12/120**	**24/240**			
Andryala pinnatifida	0.2	0.27	0.27	0.42	0.2	0.1	0	0	0	0.67
Brachypodium arbuscula	0.17	0.3	0.1	0.32	0.1	0	0	0	0	0.91
Carex canariensis	0	0	0	0	0.07	0	0	15	0.17	0.59
Cistus monspelliensis	0.93	1	0.93	0.9	0.87	0.90	0.77	5	0.13	0.94
Crambe strigosa	0	0	0	0	0	0	0	0	0	0.544
Descurainia artemisioides	0.03	0	0	0	0	0	0	0	0	0.90
Echium plantagineum	0	0	0	0.23	0.13	0	0	0	0	0.91
Hypericum canariense	0	0	0	0	0	0	0	0	0	0.56
Lavatera cretica	0.74	0.43	0.63	0.57	0.5	0.43	0.4	4	0.14	1
Limonium pectinatum	0	0	0	0	0	0	0	0	0	1
Lotus arinagensis	0.8	0.93	0.93	0.77	0.83	0.83	0.87	0	0	0.91

Melica minuta ssp. latifolia	0.97	0.63	0.8	0	0	0	0	1	0	0.99
Plantago arborescens	0.07	0	0.04	0	0	0	0	6	0.11	0.16
Plantago lagopus	0	0	0	0	0	0	0	0	0	1
Reichardia ligularis	0.3	0.27	0.23	0.37	0.37	0.2	0.13	0	0	0.73
Reseda luteola	0.53	0.3	0.73	0.7	0.7	0.33	0.43	5	0.07	0.67
Rumex vesicarius	0.9	0.9	0.5	0.83	0.73	0.4	0.33	0	0	0.88
Salvia canariensis	0	0	0	0	0	0	0	2	0.03	0.7
Sideritis discolor	0.13	0	0	0.13	0	0	0	0	0	0
Sonchus regis-jubae	0.2	0.07	0.13	0	0	0	0	0	0	0.68

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2 Type of simulation – duration of shaking in hours/duration of immersion in acid in minutes.

1 **Table S3** Correlation coefficients of seed parameters

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Seed parameters	**Water permeability**	**Seed coat thickness**	**Seed weight**
Seed coat Thickness	0.22		
Seed weight	0.29	0.39	
Seed volume	0.07	**0.46**	**0.62**

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4 Values in bold are significant at 0.05 *P*-level.

APPENDIX – PAPER 3

(THE IMPORTANCE OF SPECIES TRAITS FOR SPECIES DISTRIBUTION ON OCEANIC ISLANDS)

Table S4: Values of dispersal traits of 18 species pairs used in the study (the first mentioned is species absent from El Hierro)

species	ANEMOCHORY		HYDROCHORY			EXOZOOCHORY	ENDOZOOCHORY	
	terminal velocity (m/s)	**dispersal distance (m)**	**buoyancy[1]**	**seed survival in salt water[2]**	**T50 (min)[3]**	**seed adhesion[4]**	**seed survival after simulation[5]**	**most likely dispersal mode[6]**
Aeonium sedifolium	1.04	0.27	0.90	0.90	10080	0.20	0	0.27
Aeonium spathulatum	0.76	0.54	0.31	0.31	10080	0.05	0.10	0.54
Carex perraudieriana	1.35	1.69	0.35	0.35	10080	0.10	0	1.69
Carex canariensis	2.20	0.50	1	1	10080	0.32	0.43	0.50
Cistus symphytifolius	2.50	0.53	0.81	0.81	10080	0.15	0.78	0.78
Cistus monspeliensis	3.19	0.21	0.25	0.57	5281	0.13	0.85	0.85
Euphorbia segetalis	2.92	0.24	0.69	1	7920	0.28	0.63	0.69
Euphorbia lamarckii	3.28	0.36	0.41	0.78	6720	0.02	0.56	0.33
Hypericum glandulosum	0.89	1.31	0.77	0.77	10080	0.18	0	1.31
Hypericum grandifolium	1.12	0.96	1	1	10080	0.14	0.49	0.96
Limonium imbricatum	1.58	0.13	0.05	1	5760	0.30	0	0.30
Limonium pectinatum	1.20	0.17	0	0	5760	0.47	0	0.47
Plantago ovata	2.26	0.06	0.16	1	3195	0.30	0.04	0.30
Plantago lagopus	2.48	0.09	0.52	0.97	7620	0.05	0.01	0.05

Polycarpaea aristata	1.35	0.05	0.20	0.20	10080	0.05	0	0.05
Polycarpaea nivea	1.39	0.15	0.86	0.86	10080	0.08	0	0.15
Reichardia tingitana	0.24	0.85	0	1	900	0	0.91	0.85
Reichardia ligulata	0.49	0.87	0	0.97	410	0.15	0.52	0.87
Reseda scoparia	1.54	0.35	0.38	0.42	10080	0.12	0.62	0.35
Reseda luteola	1.82	0.49	0.56	0.60	10080	0.03	0.46	0.49
Salvia aegyptiaca	2.40	0.09	0.29	1	3382	0.53	0.01	0.53
Salvia canariensis	2.63	0.68	0.30	0.30	10080	0.47	0	0.47
Scrophularia glabrata	1.54	0.46	0.52	0.90	10080	0.12	0.32	0.46
Scrophularia arguta	1.55	0.25	0	1	45	0.10	0	0.25
Senecio leucanthemifolius	1.57	0.27	1	1	10080	0.20	0.57	0.27
Senecio glaucus	0.75	0.48	0	1	76	0.18	0	0.48
Tolpis lagopoda	1.70	0.21	0	0.73	63	0.25	0	0.21
Tolpis barbata	1.09	0.19	0	0.79	3330	0.15	0.02	0.19
Trifolium stellatum	1.74	0.09	0	0.66	900	0.10	0.97	0.10
Trifolium arvense	1.11	0.29	0.65	0.69	10080	0.12	0.59	0.12
Emex spinosa	3.02	0.11	0.16	1	90	0.20	0	0.20
Rumex bucephalophorus	1.72	0.15	0.25	0.80	5760	0.45	0.74	0.45
Monanthes laxiflora	0.47	0.17	0.35	0.35	10080	0.13	0	0.17
Aichryson laxum	0.50	0.66	0.12	0.18	10080	0.14	0.09	0.66
Descurainia millefolia	1.86	0.27	0.30	0.97	3382	0.45	0.27	0.45
Arabis caucasica	1.07	0.17	0.98	0.98	10080	0.50	0.21	0.50

[1]proportion of viable seeds which kept floating until the end of the experiment/seed viability before the experiment

[2]seed survival in salt water - the proportion of viable seeds after the experiment (both floating and sunk)/seed viability before the experiment.

[3]number of minutes, after which 50 percent of diaspores was still floating

[4]proportion of diaspores which kept attached to feathers after 1 hour

[5]proportion of viable seeds which survived the simulation/seed viability before the experiment

[6]values of the most likely dispersal mode estimated from literature

Table S5: Values of persistence traits, traits related to distribution and other traits of 18 species pairs used in the study (the first mentioned is species absent from El Hierro)

	other traits			persistence traits		distribution	
species	**seed mass (g)**	**seed viability**	**plant height (m)**	**longevity**	**woodiness**	**no. of vegetation zones**	**no. of islands**
Aeonium sedifolium	0.00003	0.56	0.28	perennial	woody	2	3
Aeonium spathulatum	0.00001	0.40	0.40	perennial	woody	1	5
Carex perraudieriana	0.00297	0.25	1	perennial	non-woody	1	4
Carex canariensis	0.00094	0.68	1.05	perennial	non-woody	1	5
Cistus symphytifolius	0.00052	0.99	1.30	perennial	woody	2	2
Cistus monspeliensis	0.00087	0.98	0.65	perennial	woody	1	5
Euphorbia segetalis	0.00234	0.88	0.70	perennial	woody	2	3
Euphorbia lamarckii	0.00857	0.89	1.15	perennial	woody	1	4
Hypericum glandulosum	0.00009	0.72	1.15	perennial	woody	1	5
Hypericum grandifolium	0.00004	0.90	1.05	perennial	woody	4	7
Limonium imbricatum	0.00121	1	0.20	perennial	non-woody	1	2
Limonium pectinatum	0.00013	0.61	0.20	perennial	woody	1	5
Plantago ovata	0.00311	0.97	0.13	annual	non-woody	1	6
Plantago lagopus	0.00061	0.87	0.20	annual	non-woody	2	7
Polycarpaea aristata	0.00003	0.57	0.07	perennial	woody	1	3
Polycarpaea nivea	0.00004	0.47	0.20	perennial	woody	1	6

Reichardia tingitana	0.00036	0.72	0.20	perennial	non-woody	3	6
Reichardia ligulata	0.00062	0.75	0.30	perennial	woody	3	6
Reseda scoparia	0.00016	0.77	0.50	perennial	woody	1	4
Reseda luteola	0.00024	0.80	0.85	annual	non-woody	2	6
Salvia aegyptiaca	0.00046	0.91	0.20	perennial	woody	1	5
Salvia canariensis	0.00119	0.50	1.75	perennial	woody	3	7
Scrophularia glabrata	0.00009	0.32	0.70	perennial	woody	2	2
Scrophularia arguta	0.00008	0.91	0.38	annual	non-woody	3	7
Senecio leucanthemifolius	0.00020	0.76	0.40	annual	non-woody	1	5
Senecio glaucus	0.00016	0.28	0.30	annual	non-woody	1	6
Tolpis lagopoda	0.00031	0.32	0.35	perennial	woody	1	3
Tolpis barbata	0.00007	0.72	0.20	annual	non-woody	2	7
Trifolium stellatum	0.00223	0.72	0.15	annual	non-woody	2	6
Trifolium arvense	0.00025	0.88	0.30	annual	non-woody	2	7
Emex spinosa	0.01872	0.94	0.33	annual	non-woody	1	7
Rumex bucephalophorus	0.00020	1	0.25	annual	non-woody	1	7
Monanthes laxiflora	0.00001	0.80	0.08	perennial	woody	3	6
Aichryson laxum	0.00001	0.56	0.30	annual	non-woody	3	6
Descurainia millefolia	0.00024	0.97	0.50	perennial	woody	3	3
Arabis caucasica	0.00015	0.97	0.18	perennial	non-woody	2	5