

High matrix vegetation decreases mean seed dispersal distance but increases long wind dispersal probability connecting local plant populations in agricultural landscapes

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Supplementary material

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Table S1. Characteristics of the selected kettle holes.

n	ID_Pond	Village	Are [ha]	Longitude	Latiude	Vegetation_type	Land_use	Bee diversity		Plant diversity		TI	Pa
								H'	S	H'	S		
1	Boi_28	Boisterfelde	0.49	13.528872	53.317754	Full type reed	Cereal	8	2.0	---	---	X	
2	Boi_40	Boisterfelde	0.322	13.537215	53.317315	Full type wood	Maize	15	2.4	31	0.7		
3	Buc_1338	Buchenhain	0.119	13.556842	53.309612	Puddle type	Cereal	6	1.8	15	1.1		
4	Buc_1590	Buchenhain	0.112	13.541943	53.303302	Full type wood	Maize	10	2.0	43	2.0		
5	Buc_1598	Buchenhain	0.301	13.553020	53.308540	Open type wood	Cereal	20	2.5	42	1.3	X	
6	Buc_1599	Buchenhain	0.073	13.551940	53.308910	Full type reed	Cereal	11	2.2	13	0.5		
7	Buc_1604	Buchenhain	0.154	13.551442	53.306172	Full type reed	Cereal	4	1.3	---	---	X	X
8	Buc_2565	Buchenhain	0.71	13.558760	53.306180	Open type wood	Cereal	11	2.2	---	---		
9	Dam_892	Damerow	0.383	13.651345	53.406355	Open type reed	Cereal	25	2.5	30	1.0		X
10	Dam_893	Damerow	0.191	13.652892	53.408342	Puddle type	Cereal	5	1.6	12	1.2		
11	Dam_907	Damerow	0.057	13.638140	53.405530	Open type reed	Grassland	12	2.1	33	2.2	X	
12	Dam_908	Damerow	0.449	13.639553	53.405256	Full type reed	Grassland	3	0.7	25	0.4		
13	Dam_910	Damerow	0.102	13.641940	53.407190	Open type reed	Grassland	14	2.4	---	---		
14	Dam_911	Damerow	0.233	13.640170	53.408550	Open type wood	Grassland	13	2.4	---	---	X	
15	Fal_149	Falkenhagen	0.599	13.758482	53.349858	Full type wood	Cereal	6	1.5	---	---		
16	Fal_183	Falkenhagen	0.033	13.742717	53.367470	Open type wood	Cereal	19	2.5	22	1.2		X
17	Fal_187	Falkenhagen	0.85	13.742511	53.363995	Open type reed	Cereal	18	2.0	21	1.4		
18	Fal_190	Falkenhagen	0.265	13.727117	53.362444	Open type reed	Cereal	10	1.8	33	1.4		X
19	Kra_312	Kraatz	0.724	13.686318	53.386734	Open type reed	Rape	9	1.8	26	2.1		
20	Kra_805	Kraatz	0.32	13.662017	53.394665	Open type wood	Cereal	11	1.8	---	---	X	X
21	Kra_807	Kraatz	0.147	13.665798	53.397377	Open type reed	Cereal	11	2.0	41	1.9		
22	Kra_808	Kraatz	0.323	13.667568	53.396518	Open type wood	Cereal	10	1.8	---	---		
23	Par_1228	Parmen	0.199	13.598962	53.364171	Open type wood	Maize	15	2.3	42	2.2		
24	Par_1229	Parmen	0.069	13.597662	53.363931	Full type wood	Maize	14	2.5	26	0.8		
25	Raa_1189	Raakow	0.105	13.618345	53.353518	Open type reed	Maize	14	2.4	28	1.3		
26	Raa_2484	Raakow	1.486	13.623681	53.352275	Full type reed	Maize	11	1.9	14	0.9	X	X
27	Raa_606	Raakow	0.09	13.629944	53.347328	Full type reed	Cereal	9	2.1	18	1.9		

28	Raa_607	Raakow	0.392	13.631487	53.347977	Full type reed	Cereal	5	1.4	28	0.8	X
29	Rit_258	Rittgarten	0.429	13.707032	53.382468	Open type reed	Rape	10	2.0	32	1.7	
30	Rit_259	Rittgarten	0.105	13.706979	53.384092	Open type reed	Rape	11	1.9	20	1.5	X
31	Rit_265	Wittstock	0.363	13.704492	53.378195	Open type reed	Cereal	12	1.9	33	2.1	
32	Rit_269	Wittstock	0.603	13.701001	53.376962	Open type reed	Maize	7	1.8	18	1.1	
33	Rit_275	Rittgarten	0.44	13.709490	53.385980	Open type reed	Cereal	15	1.8	42	1.5	X
34	Rit_287	Rittgarten	0.253	13.699214	53.385843	Open type wood	Rape	10	2.2	33	1.7	
35	Wil_235	Wilhelmshof	0.145	13.721543	53.327811	Full type reed	Rape	9	1.8	29	2.0	
36	Wil_236	Wilhelmshof	0.044	13.721488	53.328479	Full type reed	Rape	9	1.6	13	0.6	

Table S2. Statistics of dispersal distance (in m).

Species	Scenario	Minimum	1% quantile	Median	Mean	99% quantile	Maximum
<i>T. latifolia</i>	Low	0.015	1.359	12.975	27.837	236.693	7296.205
	Dynamic	0.008	0.556	13.072	26.277	213.544	7106.519
	High	0.001	0.138	2.255	13.652	203.220	17877.72
<i>P. australis</i>	Low	0.006	1.696	12.360	20.902	137.130	2556.435
	Dynamic	0.011	0.310	6.786	17.083	162.477	10045.13
	High	0.003	0.179	2.321	11.133	153.836	7878.052

Table S3. Statistics of probability of long-distance seed dispersal (LDD).

Species	Threshold distance	Scenario	Minimum	1% quantile	Median	Mean	99% quantile	Maximum
<i>T. latifolia</i>	500	Low	0	0	1.28e-5	1.70e-03	2.37e-02	1.95e-01
		Dynamic	0	0	2.13e-6	1.59e-03	2.20e-02	2.41e-01
		High	0	0	2.92e-4	2.52e-03	2.19e-02	9.89e-02
	1000	Low	0	0	3.60e-09	2.15e-04	4.72e-03	8.17e-02
		Dynamic	0	0	1.00e-10	2.71e-04	5.82e-03	8.98e-02
		High	0	0	6.13e-06	6.83e-04	9.23e-03	6.11e-02
	2000	Low	0	0	6.66e-16	1.63e-05	3.88e-04	2.86e-02
		Dynamic	0	0	0	3.36e-05	8.96e-04	3.06e-02
		High	0	0	6.19e-09	1.42e-04	2.89e-03	3.52e-02
<i>P. australis</i>	500	Low	0	0	1.82e-10	1.83e-04	4.39e-03	8.90e-02
		Dynamic	0	0	3.45e-6	1.02e-03	1.40e-02	7.65e-02
		High	0	0	4.80e-5	1.26e-03	1.43e-02	5.92e-02
	1000	Low	0	0	0	9.65e-06	1.74e-04	3.37e-02
		Dynamic	0	0	6.06e-10	1.76e-04	3.74e-03	3.62e-02
		High	0	0	2.03e-7	2.56e-04	4.61e-03	3.35e-02
	2000	Low	0	0	0	2.51e-07	6.19e-07	8.46e-03
		Dynamic	0	0	1.11e-16	2.10e-05	5.35e-04	1.70e-02
		High	0	0	8.78e-12	3.63e-05	8.90e-04	1.72e-02

Table S4. Kettle holes classification and diversity characterization. A total of 34 kettle holes were classified into four groups based on dominant vegetation, geomorphology and hydroperiod. Plant and wild bee diversity occurring in the kettle holes were characterized as species richness (S) and Shannon-Index for diversity (H'). Data is shown in mean \pm SD and N represents the number of kettle holes evaluated. Data taken from Lozada-Gobilard (2018), PhD thesis.

Type of kettle hole		N	Plant diversity		Bee diversity	
			S	H'	S	H'
Open reed	Open water body with presence of reed, canary reed grass and sedges.	13	30.5 \pm 4.9	1.6 \pm 0.3	13.7 \pm 4.9	2.1 \pm 0.3
Open wood	Open water body with predominant ruderal vegetation or shore woods.	7	32.3 \pm 3.3	1.7 \pm 0.3	12.7 \pm 3.3	2.2 \pm 0.3
Full reed	No distinct water body with predominant reed, canary reed grass and sedges all over.	10	21.6 \pm 2.8	1.1 \pm 0.4	7.9 \pm 2.9	1.7 \pm 0.4
Full wood	No distinct water body with wood species dominant in the middle such as willow, birch or alder.	4	33.3 \pm 4.1	1.2 \pm 0.5	11.3 \pm 4.1	2.1 \pm 0.5
TOTAL		34	28.3 \pm 9.2	1.4 \pm 0.6	11.5 \pm 4.5	2.0 \pm 0.4

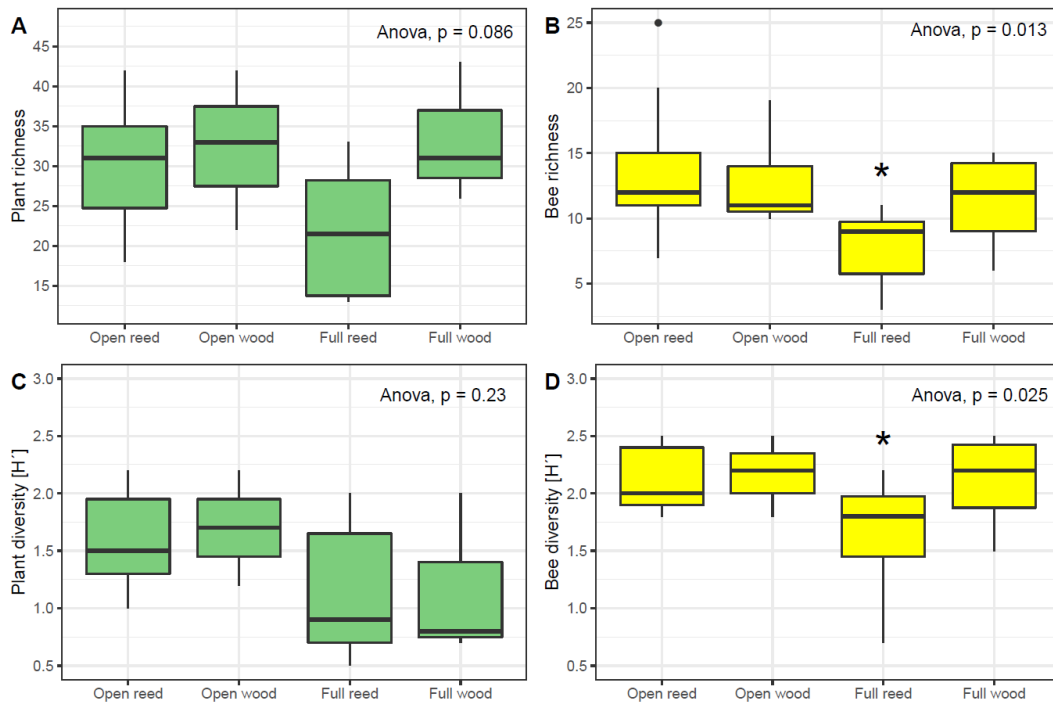


Figure S1. Plant and wild bee diversity according to different types of kettle holes. Diversity of plants and wild bees were assessed in 34 kettle holes. Diversity was characterized by species richness (A, B) and Shannon-Index (C, D) for both plants and wild bees. Data taken from Lozada-Gobilard in revision (unpublished).