Oikos

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Appendix 1

Table A1. Networks used to select central and peripheral plant species to be introduced in the field experiment. Code representing each network (Network); source of the network (Reference); location (Area) and date (Year) of data collection; number of plant (Plants) and pollinator (Poll.) species in the network. In parenthesis is the original number of species, and outside the parenthesis the final number of species after grass removal.

Network	Reference	Area	Year	Plants	Poll.
DH	Dicks et al. 2002	Norfolk	1999	16 (17)	60 (61)
DS	Dicks et al. 2002	Norfolk	1999	16	36
M	Memmott 1999	Bristol	1997	15	37
FM1	Forup and Memmott 2005	Bristol	2000	6	24
FM2	Forup and Memmott 2005	Bristol	2000	12	28
FM3	Forup and Memmott 2005	Bristol	2000	11	53
FM4	Forup and Memmott 2005	Bristol	2000	24 (25)	79
OAC	Orford unpublished	Bristol	2012	13 (24)	44 (57)
OB1	Orford et al. 2016	Bristol	2012/13	8 (13)	32 (39)
OB2	Orford et al. 2016	Gloucestershire	2012/13	10 (17)	40 (49)
OB4	Orford et al. 2016	Gloucestershire	2012/13	12 (20)	56 (66)
OB5	Orford et al. 2016	Gloucestershire	2012/13	8 (11)	13 (21)
OB6	Orford et al. 2016	Gloucestershire	2012/13	7 (16)	37 (53)

OB7	Orford et al. 2016	Somerset	2012/13	13 (15)	37 (38)
OB8	Orford et al. 2016	Somerset	2012/13	10 (15)	56 (59)
OB9	Orford et al. 2016	Somerset	2012/13	5 (8)	24 (30)
OB10	Orford et al. 2016	Somerset	2012/13	6 (9)	12 (17)

Identifying central and peripheral plant species

To select central and peripheral plant species for the field experiment we used three centrality metrics. *Normalized degree* is the number of species each species interacts with, divided by the number of possible interacting partners (here, the number of pollinator species in the network), this describing the centrality of a species in its immediate surrounding and estimating the level of species generalisation/specialisation. The two other centrality measures are calculated based on the unipartite projection (plant-plant) of bipartite (plant-pollinator) networks, in which plant species are connected if they share pollinators. *Closeness centrality* is the mean shortest distance (measured in number of interactions) between a focal plant species and all other plant species in the network. Plant species with high closeness centrality share pollinators with other plants (Freeman 1979, Martín-González et al. 2010), such that closeness centrality represents the niche overlap between plant species (Carvalheiro et al. 2014). *Betweenness centrality* is the proportion of the shortest paths (in number of interactions) connecting all plant species pairs in the network crossing a focal species. Species with high betweenness centrality increase network cohesiveness by connecting parts of the network that would be isolated (Freeman 1979, Martín-González et al. 2010). All centrality metrics were calculated using *bipartite* R package (Dormann et al. 2008, Dormann 2011, R Core Team 2017).

After calculating the three centrality indices for each plant species in each network, we controlled for species abundance. We did so as our objective was to focus on species whose centrality measures truly reflect attractiveness to pollinators, and not higher sampling effort. To control for plant species abundance, we compared the observed centrality of each plant species in each network with a null expectation. We generated 1000 null network counterparts for each empirical network using a null model in which plants and pollinators were assigned interactions in proportion to their relative abundances but keeping connectance constant (Vázquez et al. 2007). The probability of an interaction between plant i and pollinator j is:

$$p_{ij} = p_i * p_{j,} \qquad \text{(Eq. A1)}$$

where p_i is the abundance of plant species i relative to all other plant species in the network, and p_j is the abundance of pollinator species j relative to all other pollinator species in the network. Plant species abundances were measured as floral abundance in the original datasets. As plant relative abundance information was not directly available for three datasets (DS, DH and M, Table A1), we extracted this information from the network plots available in the original publications. As we did not have independent abundance measures for pollinator species, we used interaction frequency as a proxy (Blüthgen et al. 2008, Dormann et al. 2017). Then, we compared the three observed centrality metrics of species i in empirical network k to the centrality of species i in all null counterparts of k using standardised effect sizes (SES):

$$SES_{ik} = \frac{c_{ik} - \overline{c_{in}}}{\mathrm{sd}(c_{in})}, \qquad \text{(Eq. A2)}$$

where SES_{ik} is the standardised effect size of species i in network k, c_{ik} is the centrality metric of species i in empirical network k, and $\overline{c_{in}}$ and $sd(c_{in})$ are the average and standard deviation of plant species' i centralities in the null counterparts of k, respectively. We averaged the three SES (one for each centrality metric) of each species in each network, and then averaged the SES of each species across networks, so that each plant species was assigned one SES value. This approach provided each plant species with a single value which was straightforward to compare across networks and species, and easily interpretable since positive SES values represent species whose observed centrality is above null model expectation and vice versa. We ranked the 60 plant species present in the 17 networks using their SES values, from the most central to the most peripheral species (Table A2).

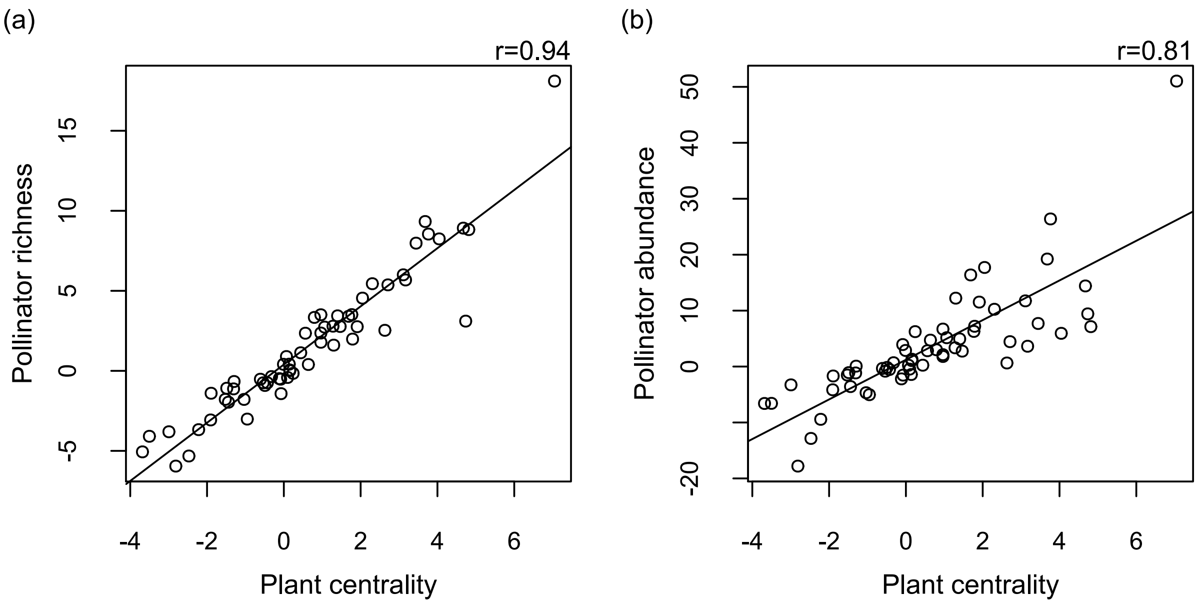

Figure A1. Correlation between plant species attractiveness (richness and abundance of flower visitors attracted by each plant species) and centrality. Each point corresponds to one plant species present in the original dataset (Table A2). Richness and abundance of flower visitors per plant species were calculated following the same steps used for plant centrality (see *Identifying central and peripheral plant species*): values were first calculated per species per network, then corrected for plant abundance (null models and SES), SES values were then averaged per species across networks.

Table A2. Combined plant species from the 17 networks used to select central and peripheral species. Species are ranked from the highest to the lowest mean centrality, the average of normalised degree (ND), closeness (CC) and betweenness centrality (BC). All values are z-scored. Central species are among the top 20 ranked species, and peripheral species are among the bottom 20 ranked species. Central and peripheral species are marked with *.

Rank	Family	Plant species	ND	CC	BC	Mean
1	Ranunculaceae	*Ranunculus bulbosus*	16.83	0.99	3.33	7.05
2*	Caprifoliaceae	*Knautia arvensis*	8.93	2.24	3.28	4.82
3	Asteraceae	*Cirsium palustre*	3.24	1.22	9.74	4.74
4	Apiaceae	*Heracleum sphondylium*	8.77	0.45	4.80	4.67
5*	Asteraceae	*Achillea millefolium*	8.02	0.58	3.54	4.05
6	Apiaceae	*Torilis japônica*	8.15	2.06	1.09	3.77
7	Asteraceae	*Cirsium* sp.	10.37	0.77	-0.10	3.68
8	Asteraceae	*Cirsium vulgare*	9.83	0.50	0.00	3.44
9	Rosaceae	*Filipendula ulmaria*	5.60	1.33	2.59	3.17
10	Asteraceae	*Taraxacum officinale* agg.	5.91	0.84	2.59	3.11
11	Apiaceae	*Angelica sylvestris*	5.72	0.83	1.58	2.71
12	Orchidaceae	*Orchis morio*	2.41	1.12	4.37	2.63
13*	Asteraceae	*Eupatorium cannabinum*	5.72	1.26	-0.07	2.30
14*	Asteraceae	*Leontodon hispidus*	4.48	1.64	0.02	2.05
15	Asteraceae	*Senecio squalidus*	2.86	1.31	1.56	1.91
16	Fabaceae	*Vicia craca*	1.89	1.48	2.00	1.79
17	Asteraceae	*Leontodon autumnalis*	3.52	1.36	0.43	1.77
18*	Asteraceae	*Centaurea nigra*	3.37	0.93	0.76	1.69
19	Asteraceae	*Hypochaeris radicata*	2.59	0.75	1.05	1.47

20	Asteraceae	*Cirsium arvense*	3.49	0.07	0.64	1.40
21	Asteraceae	*Crepis paludosa*	1.69	0.53	1.67	1.30
22	Asteraceae	*Crepis capillaris*	2.76	0.84	0.24	1.28
23	Geraniaceae	*Geranium pratense*	3.12	0.17	-0.10	1.06
24	Ranunculaceae	*Clematis vitalba*	1.84	0.99	0.06	0.96
25	Apiaceae	*Daucus carota*	3.80	-0.78	-0.13	0.96
26	Asteraceae	*Matricaria discoidea*	1.91	1.11	-0.13	0.96
27	Brassicaceae	*Cardamine pratensis*	3.61	-1.08	-0.14	0.79
28	Caryophyllaceae	*Stellaria media*	0.38	-0.47	2.00	0.64
29	Apiaceae	*Aethusa cynapium*	2.26	0.07	-0.65	0.56
30	Asteraceae	*Senecio jacobaea*	0.99	-0.05	0.38	0.44
31	Asteraceae	*Crepis vesicaria*	-0.11	0.89	-0.06	0.24
32	Asteraceae	*Leontodon saxatilis*	0.06	0.71	-0.30	0.16
33	Fabaceae	*Trifolium pratense*	0.02	0.28	0.16	0.15
34	Asteraceae	*Leucanthemum vulgare*	0.44	0.20	-0.22	0.14
35	Apiaceae	*Conopodium majus*	-0.39	0.84	-0.16	0.10
36	Fabaceae	*Vicia sativa*	0.73	-0.54	0.02	0.07
37	Rubiaceae	*Galium verum*	0.43	-0.48	0.02	-0.01
38	Asteraceae	*Crepis biennis*	-1.47	0.77	0.49	-0.07
39	Fabaceae	*Lathyrus pratensis*	-0.58	-0.54	0.88	-0.08
40	Ranunculaceae	*Ranunculus acris*	-0.49	0.60	-0.46	-0.12
41	Ranunculaceae	*Ranunculus repens*	-0.38	-0.07	-0.51	-0.32
42	Asteraceae	*Bellis perennis*	-0.73	0.01	-0.57	-0.43
43*	Caryophyllaceae	*Lychnis flos-cuculi*	-0.94	-0.15	-0.39	-0.49

44	Rosaceae	*Rubus fruticosus*	-0.78	-0.55	-0.29	-0.54
45	Brassicaceae	*Capsella bursa-pastoris*	-0.30	-0.78	-0.75	-0.61
46	Linaceae	*Linum catharticum*	-3.05	0.69	-0.50	-0.95
47	Onagraceae	*Chamerion angustifolium*	-1.74	-0.35	-1.02	-1.04
48*	Lamiaceae	*Prunella vulgaris*	-0.57	-4.53	1.21	-1.30
49	Apiaceae	*Anthriscus sylvestris*	-1.15	-2.48	-0.30	-1.31
50	Fabaceae	*Trifolium repens*	-1.99	-1.46	-0.88	-1.44
51*	Gentianaceae	*Centaurium erythraea*	-1.10	-2.97	-0.39	-1.49
52*	Fabaceae	*Lotus corniculatus*	-1.78	-2.36	-0.44	-1.53
53	Caryophyllaceae	*Cerastium fontanum*	-1.41	-3.95	-0.32	-1.89
54	Convolvulaceae	*Convolvulus arvensis*	-3.12	-1.64	-0.96	-1.91
55	Primulaceae	*Primula veris*	-3.71	-1.39	-1.56	-2.22
56*	Rosaceae	*Agrimonia eupatoria*	-5.44	-0.98	-1.00	-2.47
57	Fabaceae	*Trifolium dubium*	-5.71	-1.33	-1.40	-2.81
58	Orobanchaceae	*Rhinanthus minor*	-3.98	-3.49	-1.51	-2.99
59	Orobanchaceae	*Euphrasia officinalis*	-4.31	-4.93	-1.27	-3.50
60	Fabaceae	*Medicago lupulina*	-4.82	-5.01	-1.22	-3.68

Figure A2. (a) Individual of field scabious (*Knautia arvensis*) immediately after introduction; (b) View of Plot A being mowed before the beginning of the sampling season; (c) View of Plot B at the beginning of the sampling season (June 2017); (d) Adult individual of field scabious at the end of the sampling season (August 2017).

Table A3. List of resident plant species in the experimental plots. Codes R1 to R13 are assigned to species which were observed receiving insect visits and correspond to codes used in Figures 2 and A3. Species family, name, their occurrence in experimental plots A and/or B (marked with an X) and centrality rank (see Table A2).

Code	Family	Species	Plot A	Plot B	Rank
R1	Asteraceae	*Bellis perennis*	X		42
-	Convolvulaceae	*Calystegia silvatica*		X	
R2	Caryophyllaceae	*Cerastium fontanum*	X	X	53
R6	Convolvulaceae	*Convolvulus arvensis*		X	54
R7	Asteraceae	*Crepis capillaris*		X	22
R8	Geraniaceae	*Geranium dissectum*		X	
-	Geraniaceae	*Geranium molle*	X		
R9	Apiaceae	*Heracleum sphondylium*		X	4
R10	Fabaceae	*Lathyrus pratensis*		X	39
-	Plantaginaceae	*Plantago lanceolata*	X	X	
R11	Ranunculaceae	*Ranunculus acris*		X	40
R3	Ranunculaceae	*Ranunculus repens*	X		41
R4	Asteraceae	*Taraxacum officinale agg.*	X	X	10
R12	Asteraceae	*Tragopogon pratensis*		X	
R13	Fabaceae	*Trifolium pratense*		X	33
R5	Fabaceae	*Trifolium repens*	X	X	50
-	Plantaginaceae	*Veronica persica*	X	X	

Table A4. Definition of flower unit for all plant species present in both experimental plots. Species type (C=central, P=peripheral or R= resident), name, and flower unit definition (FU), which corresponds either to a single flower (SF) or to a portion of an inflorescence which can be accessed by an insect without flight (I).

Type	Species name	FU	Type	Species name	FU
C	*Achillea millefolium*	I	R	*Crepis capillaris*	I
C	*Centaurea nigra*	I	R	*Geranium dissectum*	SF
C	*Eupatorium cannabinum*	I	R	*Geranium molle*	SF
C	*Knautia arvensis*	I	R	*Heracleum sphondylium*	I
C	*Leontodon hispidus*	I	R	*Lathyrus pratensis*	SF
P	*Agrimonia eupatoria*	SF	R	*Plantago lanceolata*	I
P	*Centaurium erythraea*	SF	R	*Ranunculus acris*	SF
P	*Lotus corniculatus*	SF	R	*Ranunculus repens*	SF
P	*Lychnis flos-cuculi*	SF	R	*Taraxacum officinale* agg.	I
P	*Prunella vulgaris*	I	R	*Tragopogon pratensis*	I
R	*Bellis perennis*	I	R	*Trifolium pratense*	I
R	*Calystegia silvatica*	SF	R	*Trifolium repens*	I
R	*Cerastium fontanum*	SF	R	*Veronica persica*	SF
R	*Convolvulus arvensis*	SF	-	-	-

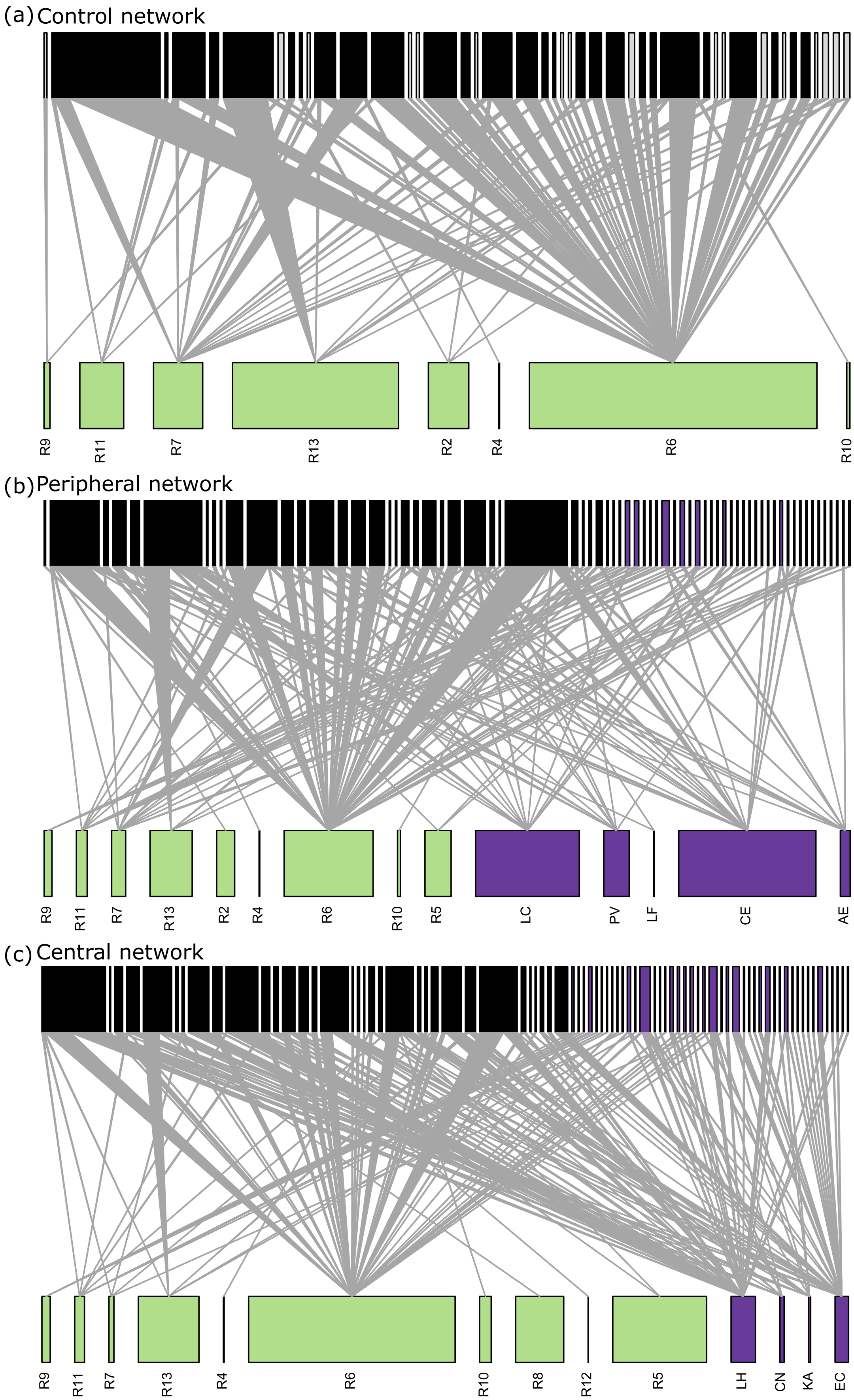
(a) Control network
R9
R11
R7
R13
R2
R4
R6
R10
(b) Peripheral network
R9
R11
R7
R13
R2
R4
R6
R10
R5
LC
PV
LF
CE
AE
(c) Central network
R9
R11
R7
R13
R4
R6
R10
R8
R12
R5
LH
CN
KA
EC

Figure A3. Quantitative pollination networks of (a) control, (b) peripheral and (c) central treatments of Plot B. The networks show interaction data pooled across all subplots for each treatment in this plot, although analyses were conducted on a per-subplot-per-plot basis. For each network, lower bars represent plant species abundance, top bars represent insect species abundance and link widths represent interaction frequency between species pairs. In purple are introduced plant species and insect species that only appear in peripheral and central subplots. In light grey (control network) are insect species only observed in control subplots. Codes for introduced plant species: KA=*Knautia arvensis*, AM=*Achillea millefolium*, CN=*Centaurea nigra*, LH=*Leontodon hispidus*, EC=*Eupatorium cannabinum*, LF=*Lychnis flos-cuculi*, PV=*Prunella vulgaris*, LC=*Lotus corniculatus*, CE=*Centaurium erythraea*, AE=*Agrimonia eupatoria*. Resident species were numbered from R1 to R13 and names are given in Table A3.

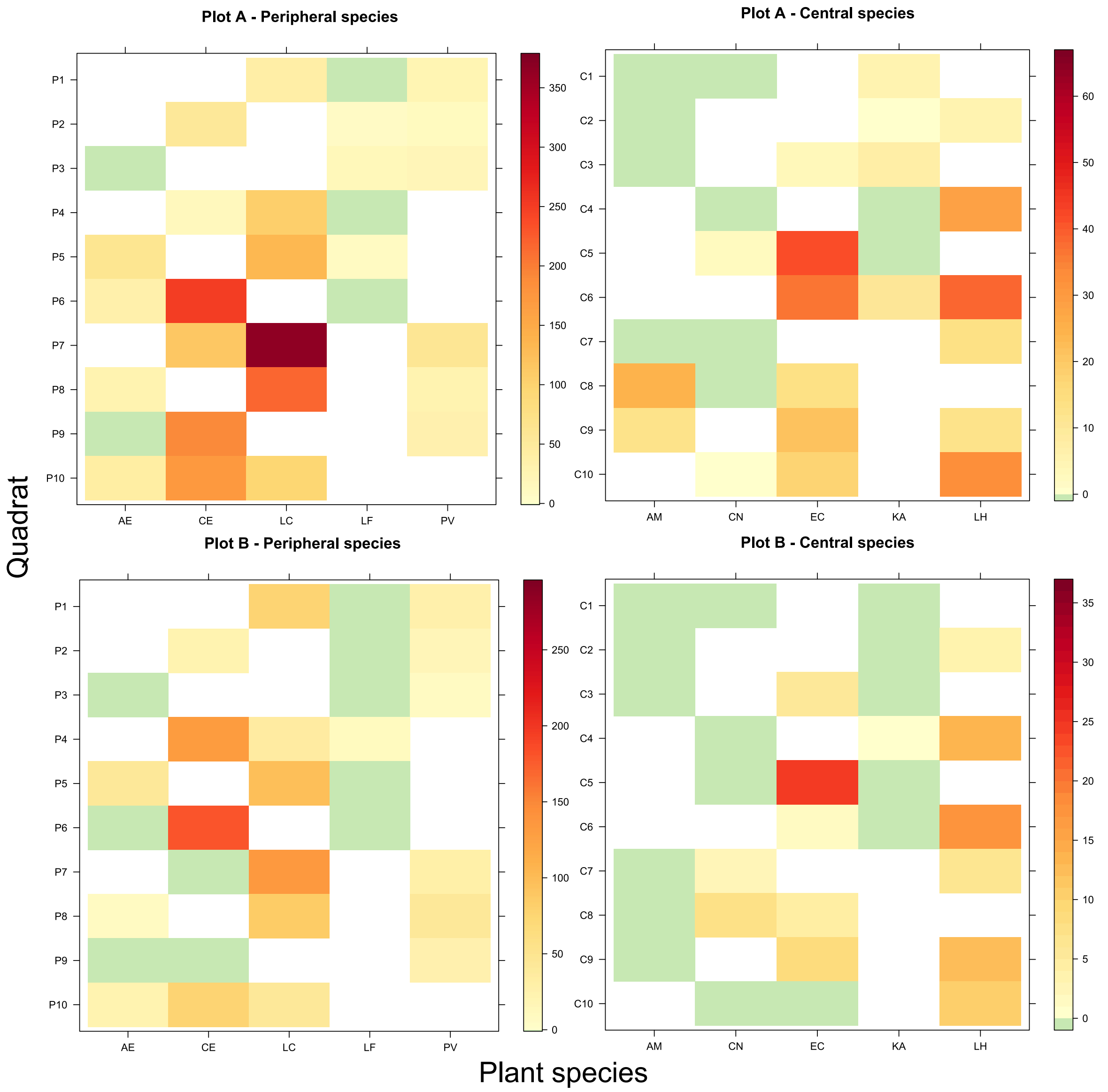

Figure A4. Flower abundance per introduced species across subplots in Plot A and Plot B. Species codes: AE=*Agrimonia eupatoria*, AM=*Achillea millefolium*, CE=*Centaurium erythraea*, CN=*Centaurea nigra*, EC=*Eupatorium cannabinum,* KA=*Knautia arvensis*, LC=*Lotus corniculatus*, LF=*Lychnis flos-cuculi*, LH=*Leontodon hispidus*, PV=*Prunella vulgaris*. Peripheral subplots are marked as P1 to P10 and central subplots as C1 to C10. Squares are white when that species was not assigned to that subplot, light green when the species assigned to that subplot did not flower, and ranging from light yellow to dark red to represent the number of flowers of that species in that subplot.

Table A5. Flowering success of central and peripheral species: species name and number of individual plants of each species (out of 18) that successfully flowered in Plots A and B.

Central species	Plot A	Plot B	Peripheral species	Plot A	Plot B
Achillea millefolium	3	0	*Agrimonia eupatoria*	9	8
Centaurea nigra	10	6	*Centaurium erythraea*	17	16
Eupatorium cannabinum	17	11	*Lotus corniculatus*	18	18
Knautia arvensis	11	4	*Lychnis flos-cuculi*	7	1
Leontodon hispidus	18	17	*Prunella vulgaris*	18	17

Table A6. Number of plant and insect species per network. Interactions for each network were collected in one subplot: 10 per treatment (control, peripheral, central) per plot (Plot A, Plot B) resulting in 60 pollination networks. The four control networks excluded from the network-level analysis (question 3) due to their small size are marked in light grey.

		Control		Peripheral		Central	
Plot	Subplot	Insects	Plants	Insects	Plants	Insects	Plants
Plot A	1	4	3	7	4	29	5
Plot A	2	2	1	10	5	21	4
Plot A	3	2	2	11	4	14	4
Plot A	4	6	2	16	3	27	3
Plot A	5	5	2	20	5	24	5
Plot A	6	13	3	17	5	37	5
Plot A	7	8	3	17	5	27	4
Plot A	8	8	3	20	6	30	6
Plot A	9	10	3	14	6	29	5
Plot A	10	5	1	21	6	36	4
Plot B	1	12	4	5	3	14	5
Plot B	2	19	3	20	5	26	3
Plot B	3	14	1	20	5	36	5
Plot B	4	12	2	26	6	22	5
Plot B	5	14	4	21	6	21	4
Plot B	6	14	3	22	9	20	7
Plot B	7	9	3	12	4	27	6
Plot B	8	16	4	14	6	12	4
Plot B	9	3	2	21	5	26	6
Plot B	10	13	3	13	4	15	3

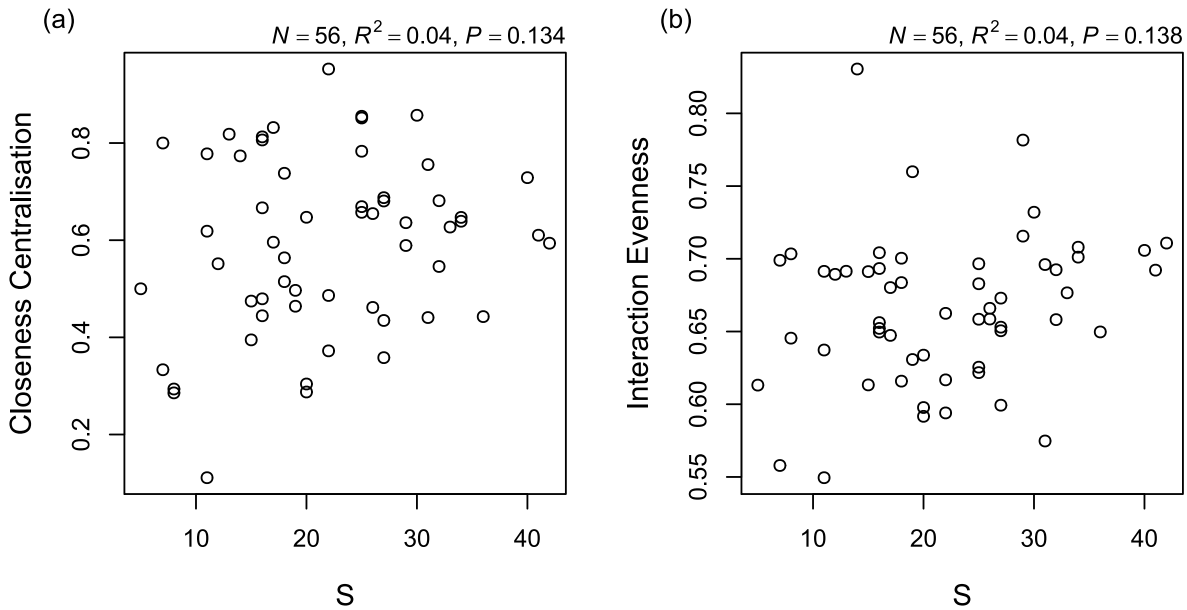

Figure A5. Relationship between network-level metrics and network size after metrics were normalized: (a) closeness centralisation and (b) interaction evenness. Network size (S) is the sum of plant and insect species.

Table A7. List of insect species collected in the field experiment.

Order	Species	Plot A	Plot B
Coleoptera	*Altica* sp.	1	0
Coleoptera	*Amara familiaris*	1	0
Coleoptera	*Coccinella septempunctata*	0	2
Coleoptera	*Corizus hyoscyami*	0	1
Coleoptera	*Meligethes* sp.	20	7
Coleoptera	*Oedemera nobilis*	0	3
Coleoptera	*Rhagonycha fulva*	1	10
Coleoptera	*Tachyporus nitidulus*	1	0
Diptera	*Anthomyia liturata*	8	0
Diptera	*Botanophila* sp.	16	5
Diptera	*Botanophila striolata*	54	0
Diptera	*Brachicoma devia*	0	1
Diptera	*Cheilosia albitarsis*	1	1
Diptera	*Cheilosia bergenstammi*	1	0
Diptera	*Cheilosia impressa*	0	1
Diptera	*Cheilosia pagana*	11	0
Diptera	*Chloromyia formosa*	2	0
Diptera	*Chromatomyia milii*	1	0
Diptera	*Chrysotoxum bicinctum*	0	16
Diptera	*Chrysotoxum festivum*	1	5
Diptera	*Chrysotoxum vernale*	1	0
Diptera	*Coenosia tigrina*	10	0
Diptera	*Dasysyrphus albostriatus*	1	1

Diptera	*Delia platura*	2	3
Diptera	*Delia* sp.	2	3
Diptera	*Dicraeus vagans*	0	1
Diptera	*Dolichopus trivialis*	1	0
Diptera	*Dolichopus ungulatus*	2	0
Diptera	*Empis albinervis*	0	1
Diptera	*Empis femorata*	2	0
Diptera	*Empis livida*	0	6
Diptera	*Empis* sp.	1	0
Diptera	*Epistrophe grossulariae*	1	0
Diptera	*Episyrphus balteatus*	80	84
Diptera	*Eriothrix rufomaculata*	5	13
Diptera	*Eristalis tenax*	9	2
Diptera	*Eumerus tuberculatus*	6	26
Diptera	*Eupeodes corollae*	10	26
Diptera	*Eupeodes latifasciatus*	7	4
Diptera	*Eupeodes latilunulatus*	1	0
Diptera	*Eupeodes luniger*	4	27
Diptera	*Fannia serena*	1	0
Diptera	*Fannia* sp.	0	1
Diptera	*Fernandia cuprea*	4	1
Diptera	*Helina parcepilosa*	0	1
Diptera	*Helina reversio*	1	0
Diptera	*Helina* sp.	1	1
Diptera	*Helina tetrastigma*	0	1

Diptera	*Helophilus pendulus*	9	4
Diptera	*Heringia heringi*	1	0
Diptera	*Hydrellia maura*	17	0
Diptera	*Limnia unguicornis*	0	1
Diptera	*Lonchoptera furcata*	1	1
Diptera	*Lucilia sericata*	16	7
Diptera	*Megaselia* sp.	0	1
Diptera	*Melanomya nana*	1	0
Diptera	*Melanostoma mellinum*	1	6
Diptera	*Melanostoma scalare*	7	0
Diptera	*Melastoma* sp.	1	0
Diptera	*Meliscaeva cinctella*	1	0
Diptera	*Merodon equestris*	7	5
Diptera	*Meromyza* sp.	0	2
Diptera	*Metopia* sp.	1	0
Diptera	*Myathropa florea*	1	2
Diptera	*Neoascia podagrica*	1	0
Diptera	*Ocytata pallipes*	0	2
Diptera	*Opomyza germinationis*	1	1
Diptera	*Opomyza petrei*	1	0
Diptera	*Oscinella frit*	0	4
Diptera	*Oscinella nitidissima*	2	0
Diptera	*Oscinella* sp.	0	1
Diptera	*Pachygaster atra*	1	0
Diptera	*Paragus haemorrhous*	0	1

Diptera	*Paragus* sp.	1	0
Diptera	*Paregle audacula*	1	0
Diptera	*Pegoplata aestiva*	33	57
Diptera	*Phaonia serva*	1	0
Diptera	*Phasia obesa*	0	1
Diptera	*Phasia pusilla*	0	2
Diptera	*Phora* sp.	0	1
Diptera	*Pipizella viduata*	5	2
Diptera	Pipunculidae sp.	0	1
Diptera	*Platycheirus albimanus*	46	38
Diptera	*Platycheirus scutatus*	6	1
Diptera	*Platycheirus* sp.	0	2
Diptera	*Platycheirus sticticus*	1	2
Diptera	*Pyrophaena rosarum*	1	0
Diptera	*Rhamphomyia variabilis*	7	1
Diptera	*Rhingia campestris*	1	0
Diptera	*Rhingia rostrata*	5	0
Diptera	*Rhinophora lepida*	9	1
Diptera	*Sarcophaga haemorrhoa*	1	0
Diptera	*Sarcophaga nigriventris*	3	2
Diptera	*Sarcophaga* sp.	2	1
Diptera	*Sarcophaga subvicina*	1	0
Diptera	*Sarcophaga variegata*	1	0
Diptera	*Scaeva pyrastri*	2	6
Diptera	*Scathophaga stercoraria*	1	5

Diptera	Sciaridae sp.	1	0
Diptera	*Sepsis* sp.	1	1
Diptera	*Sicus ferrugineus*	1	0
Diptera	*Siphona geniculata*	2	1
Diptera	*Siphona* sp.	0	1
Diptera	*Solieria* sp.	1	0
Diptera	*Sphaerophoria bankowskae*	0	2
Diptera	*Sphaerophoria menthastri*	3	10
Diptera	*Sphaerophoria scripta*	7	13
Diptera	*Sphaerophoria spp.*	23	23
Diptera	*Sphaerophoria taeniata*	0	7
Diptera	*Suillia variegata*	1	0
Diptera	*Syritta pipiens*	33	8
Diptera	*Syrphus ribesii*	31	17
Diptera	*Tetanocera elata*	1	0
Diptera	*Thecophora atra*	0	1
Diptera	*Volucella inanis*	2	0
Diptera	*Volucella pellucens*	3	0
Diptera	*Xanthogramma pedissequum*	2	3
Hymenoptera	*Ancistrocerus gazella*	0	1
Hymenoptera	*Andrena bicolor*	1	0
Hymenoptera	*Andrena dorsata*	0	1
Hymenoptera	*Andrena fulvago*	2	0
Hymenoptera	*Andrena minutula*	1	0
Hymenoptera	*Andrena semilaevis*	5	1

Hymenoptera	*Andrena* sp.	1	0
Hymenoptera	*Apis mellifera*	51	39
Hymenoptera	*Athalia* sp.	0	1
Hymenoptera	Aulacidae sp.	0	1
Hymenoptera	*Bombus hortorum*	1	2
Hymenoptera	*Bombus hypnorum*	1	0
Hymenoptera	*Bombus lapidarius*	25	20
Hymenoptera	*Bombus lucorum*	4	3
Hymenoptera	*Bombus pascuorum*	52	81
Hymenoptera	*Bombus pratorum*	1	0
Hymenoptera	*Bombus terrestris*	10	6
Hymenoptera	*Bombus psithyrus sp.*	1	0
Hymenoptera	Braconidae sp.	6	6
Hymenoptera	Chalcidoidea sp.	5	4
Hymenoptera	Gasteruptiidae sp.	1	0
Hymenoptera	*Halictus rubicundus*	4	2
Hymenoptera	*Halictus tumulorum*	57	44
Hymenoptera	*Hylaeus hyalinatus*	2	0
Hymenoptera	Ichneumonidae sp.	1	3
Hymenoptera	*Lasioglossum albipes*	7	5
Hymenoptera	*Lasioglossum calceatum*	23	41
Hymenoptera	*Lasioglossum fulvicorne*	0	2
Hymenoptera	*Lasioglossum lativentris*	0	1
Hymenoptera	*Lasioglossum morio*	18	3
Hymenoptera	*Lasioglossum smaethmanellum*	5	126

Hymenoptera	*Lasioglossum* sp.	0	2
Hymenoptera	*Lasioglossum villosulum*	4	19
Hymenoptera	*Lasioglossum leucozonium*	0	7
Hymenoptera	*Megachile centuncularis*	3	0
Hymenoptera	*Megachile ligniseca*	5	1
Hymenoptera	*Megachile willughbiella*	8	2
Hymenoptera	*Melitta leporina*	1	1
Hymenoptera	*Nomada fabriciana*	2	0
Hymenoptera	*Nomada flavoguttata*	1	0
Hymenoptera	*Osmia bicornis*	1	0
Hymenoptera	*Osmia caerulescens*	4	3
Hymenoptera	*Osmia leaiana*	8	0
Hymenoptera	*Sphecodes monilicornis*	2	1
Hymenoptera	*Tenthredo* sp.	0	5
Hymenoptera	*Vespula germanica*	1	0
Hymenoptera	*Vespula vulgaris*	1	0
Lepidoptera	*Maniola jurtina*	0	10
Lepidoptera	*Pararge aegeria*	1	0
Lepidoptera	*Pieris napi*	2	1
Lepidoptera	*Thymelicus lineola*	0	14
Lepidoptera	*Thymelicus sylvestris*	0	3
Hemiptera	Miridae sp.	0	1
Thysanoptera	Thysanoptera sp.	0	1

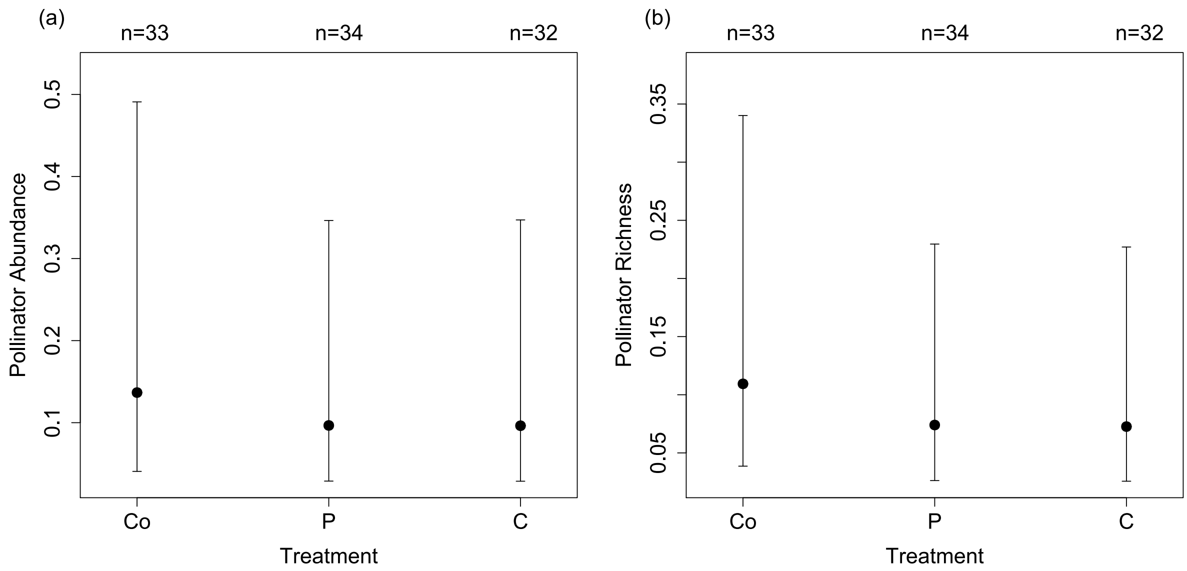

Figure A6. Insect visitation (model estimates and confidence intervals for Plot A) to the five resident species with a peripheral status in control (Co), peripheral (P) and central (C) networks: (a) pollinator abundance and (b) pollinator richness. The five species are: *Bellis perennis, Cerastium fontanum*, *Convolvulus arvensis*, *Ranunculus repens* and *Trifolium repens*.

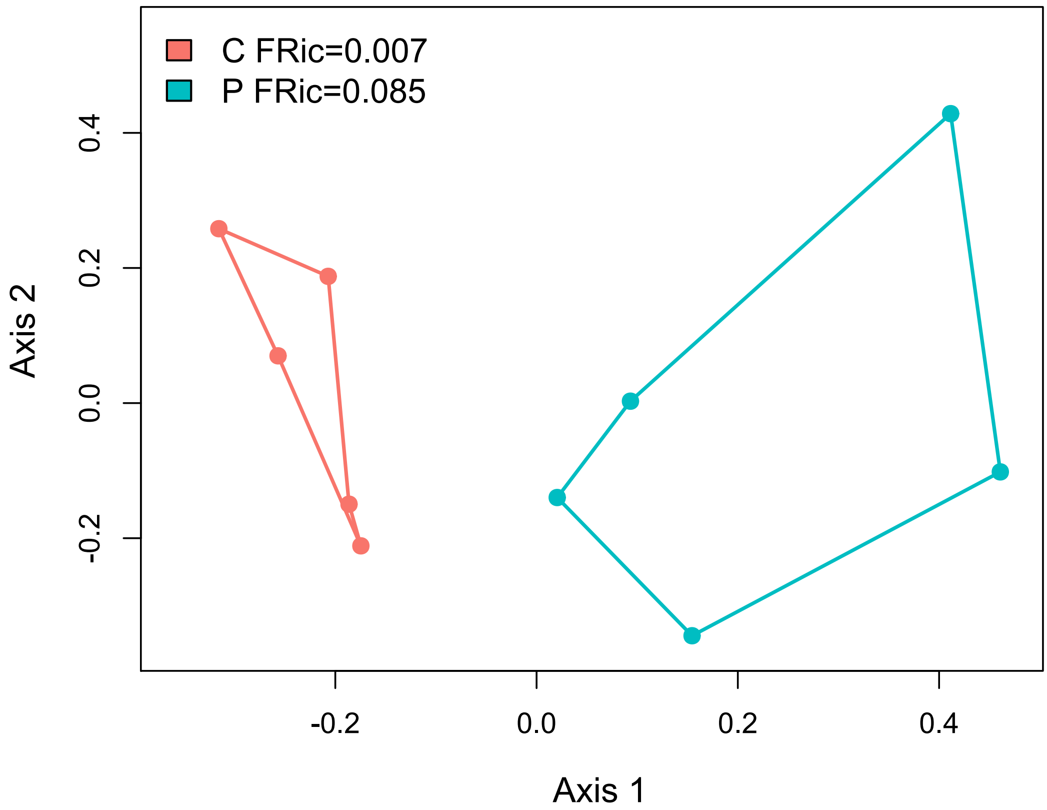

Figure A7. Results of the Functional Richness analysis (FRic, Villéger et al. 2008). Plot of a functional space including only the first two axes (nine axes were used for calculations of FRic). Each point corresponds to a plant species (central species in pink, peripheral in blue). Lines of each colour enclose the volume defining FRic for each group, showing that central and peripheral species present a different set of traits (no overlap between groups), and central species present a more similar set of traits than peripheral species (lower Fric for central than for peripheral species). Both analyses were performed with the FD R package (Laliberté and Legendre 2010, Laliberté et al. 2014). Functional traits used: i) flower colour and ii) inflorescence type (both categorical), iii) petal size (in centimetres), iv) peak of flowering season (date transformed into the corresponding day of the year) and v) total nectar content (total sugar in µg per flower unit as defined in Baude et al. 2016). Data sources: Ecoflora database (Fitter and Peat 1994) for colour, inflorescence type and petal size and Baude et al. (2016) for peak of flowering season and nectar content.

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