The pollination trade-off

Supplementary information

Fernando Cagua, Hugo Marrero, Jason Tylianakis, Daniel Stouffer

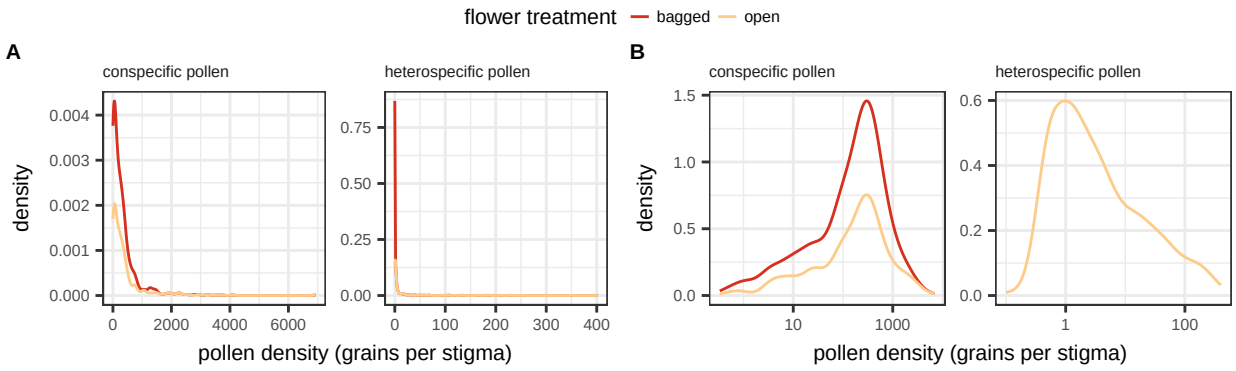

Figure S1: Distribution of stigmatic pollen density plotted in (A) a linear scale, and (B) a logarithmic scale (zero values not shown).

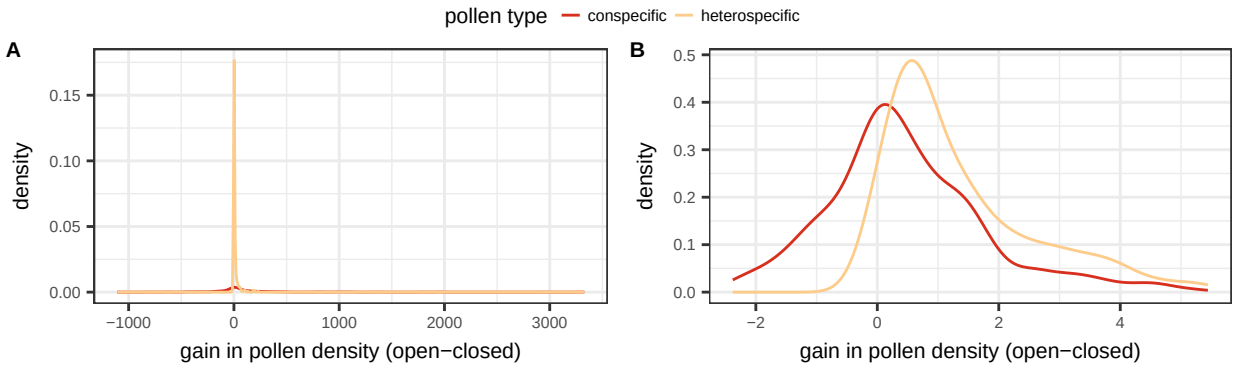

Figure S2: Distribution of the difference on stigmatic pollen density between open and closed flowers for one of the bootstrap replicates used in the model sets. When (A) using directly the gain in pollen density and (B) when pollen density is log transormed prior to calculating the gain.

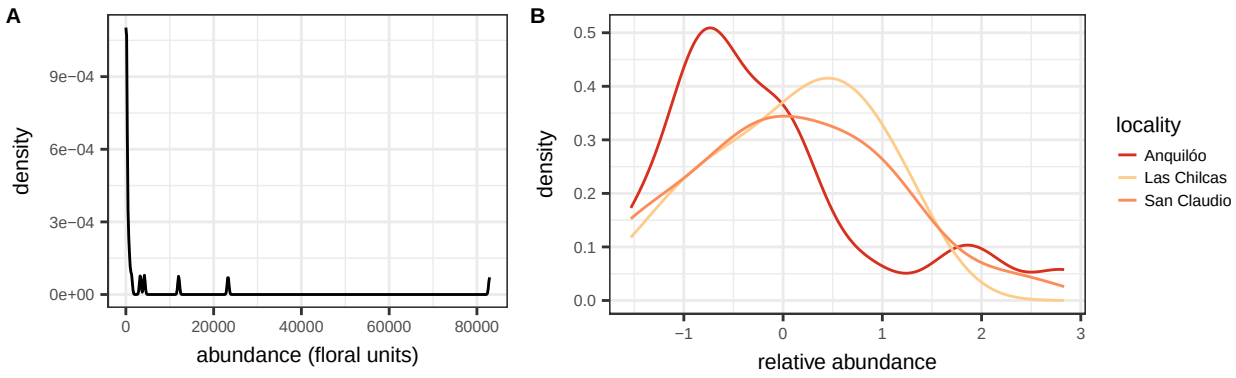

Figure S3: Distribution of plant abundance as (A) raw counts of floral units across communities, and (B) after applying a data transformation in which the counts have been log transformed and scaled to have a mean of zero and a standard deviation of one.

Table S1: Results of testing the alternative hypothesis that the conspecific pollen density in open flowers is greater than the density in bagged flowers. Tests were performed at the species level (across communities).

plant species	difference	statistic	p value
Aloysia gratissima	31.6666177	9.0	0.0382613
Baccharis pingraea	2.9999531	156.0	0.0000308
Carduus acanthoides	0.0000386	1077.0	0.4953884
Cirsium vulgare	-109.7728636	82.0	0.9969050
Condalia microphylla	-8.9004993	20.0	0.7499117
Cypella herbertii	2428.2500000	20.0	0.0151515
Descurania argentina	21.5000000	61.0	0.0599151
Diplotaxis tenuifolia	198.7500000	217.0	0.1661275
Dipsacus sp.	6.7177679	28.5	0.0085552
Gaillardia megapotamica	-411.7500000	9.0	0.9999504
Glandularia hookeriana	-68.5833333	5.0	0.8690476
Hirschfeldia incana	29.5000848	9510.0	0.1014593
Lycium chilense	394.1666667	24.0	0.1969697
Mentha pulegium	1.0104167	34.0	0.2205997
Nierembergia aristata	769.7500000	70.0	0.0000514
Nothoscordum euosimum	199.4166667	44.0	0.0247752
Physalis viscosa	1074.0000000	15.0	0.0178571
Prosopidastrum globosum	3.3096971	20.0	0.2051239
Senecio pulcher	-25.0000000	6.0	0.7142857
Sisyrinchium platense	-22.2500000	49.0	0.6918285
Solanum sisymbriifolium	2195.0000000	3.0	0.2500000
Sphaeralcea crispa	5.7000000	15.0	0.0178571
Stemodia lanceolata	1261.0000000	25.0	0.0039683
Thelesperma megapotamicum	-23.3333333	4.0	0.6500000
Turnera sidioides	151.0000205	327.0	0.0000224
Verbena intermedia	87.0833333	367.0	0.0062368

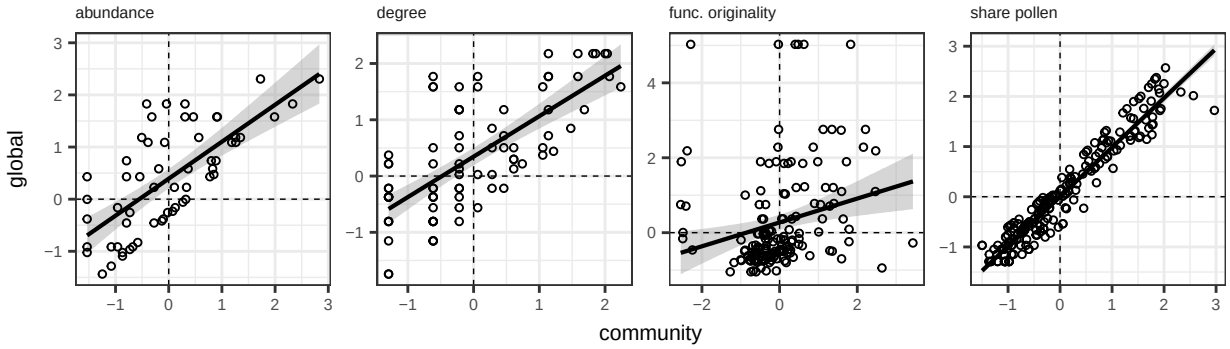

Figure S4: Relationship between the model's independent variables calculated at the community level and at the study-wide level.

Table S2: Results of testing the alternative hypothesis that the conspecific pollen density in open flowers is greater than the density in bagged flowers. Tests were performed at the community level. Only species present in more than one community are shown.

plant species	community	difference	statistic	p value
Carduus acanthoides	Anquilóo - agricultural - 2	33.000	15.0	0.018
Carduus acanthoides	San Claudio - agricultural - 1	11.500	96.0	0.253
Carduus acanthoides	San Claudio - agricultural - 2	-13.175	52.0	0.990
Carduus acanthoides	San Claudio - reserve - 1	-1.885	19.5	0.828
Carduus acanthoides	San Claudio - reserve - 2	8.751	38.5	0.123
Cirsium vulgare	Anquilóo - agricultural - 2	-38.250	12.0	0.732
Cirsium vulgare	Las Chilcas - reserve - 1	-36.750	12.0	0.732
Cirsium vulgare	San Claudio - reserve - 1	-138.833	0.0	1.000
Hirschfeldia incana	Anquilóo - agricultural - 1	100.500	263.0	0.033
Hirschfeldia incana	Anquilóo - agricultural - 2	677.000	17.0	0.024
Hirschfeldia incana	San Claudio - agricultural - 1	-176.789	165.0	0.993
Hirschfeldia incana	San Claudio - agricultural - 2	51.000	658.5	0.126
Hirschfeldia incana	San Claudio - reserve - 1	-23.250	266.0	0.691
Hirschfeldia incana	San Claudio - reserve - 2	143.000	435.5	0.016
Mentha pulegium	Las Chilcas - agricultural - 2	1.667	13.0	0.182
Mentha pulegium	Las Chilcas - reserve - 1	1.667	6.0	0.350
Nierembergia aristata	Anquilóo - agricultural - 1	721.000	1.0	0.500
Nierembergia aristata	Anquilóo - reserve - 1	846.000	9.0	0.050
Nierembergia aristata	Anquilóo - reserve - 2	881.500	18.0	0.012
Nothoscordum euosimum	Las Chilcas - agricultural - 1	305.750	18.0	0.012
Nothoscordum euosimum	Las Chilcas - agricultural - 2	38.500	5.0	0.500
Sisyrinchium platense	Las Chilcas - agricultural - 1	54.000	25.0	0.155
Sisyrinchium platense	Las Chilcas - reserve - 1	-134.000	0.0	1.000
Turnera sidioides	Anquilóo - agricultural - 1	135.250	113.0	0.001
Turnera sidioides	Anquilóo - agricultural - 2	3.000	9.0	0.036
Turnera sidioides	Anquilóo - reserve - 2	153.206	18.0	0.014
Verbena intermedia	Anquilóo - reserve - 2	35.000	13.0	0.190
Verbena intermedia	San Claudio - agricultural - 2	18.750	65.0	0.104
Verbena intermedia	San Claudio - reserve - 2	213.250	70.0	0.000

Table S3: Comparison of the different random structures we considered. The table shows median delta AIC values of 99 bootsrap resamples of the data. The 5th and 95th percentile are shown inside square brackets. Communities are defined by individual fragments but ignore the hierarchical arrangement of sampling sites.

pollen type	random structure	delta_AIC
conspecific	1 | community / plant sp.	0 [0, 4.9]
	1 | locality / land use / fragment / plant sp.	4 [3.3, 7.9]
	1 | locality / land use / plant sp.	4.8 [0, 13.5]
	1 | locality / plant sp.	3.9 [0, 17.8]
	1 | plant sp.	7.8 [0, 25.9]
heterospecific	1 | community / plant sp.	0 [0, 7.9]
	1 | locality / land use / fragment / plant sp.	4 [4, 11.3]
	1 | locality / land use / plant sp.	5.8 [2.2, 12.8]
	1 | locality / plant sp.	16 [5.2, 51.5]
	1 | plant sp.	12.7 [0, 44.2]

Table S4: Comparison of the different fixed structures we considered. The table shows median delta AIC values of 99 bootsrap resamples of the data. The 5th and 95th percentile are shown inside square brackets.

pollen type	fixed structure	delta_AIC
conspecific	~ share pollen + func. originality	0 [0 ,1.1]
	~ abundance + share pollen + func. originality	0.3 [0 ,1.4]
	~ share pollen + degree + func. originality	1.2 [0.1 ,2.2]
	~ abundance + share pollen + degree + func. originality	1.8 [0.9 ,2.8]
	~ abundance + share pollen	20.2 [17.1 ,22.4]
	~ abundance + share pollen + degree	21.8 [18.7 ,23.9]
	~ share pollen	94.4 [81.9 ,113.3]
	~ share pollen + degree	95.6 [83.6 ,114.3]
	~ abundance + func. originality	160.1 [145.2 ,178]
	~ func. originality	159.6 [145.6 ,177.9]
	~ degree + func. originality	160.5 [145.7 ,178.4]
	~ abundance + degree + func. originality	161.7 [146.7 ,179.4]
	~ abundance	188.2 [171.8 ,208]
	~ abundance + degree	189.5 [172.3 ,209]
	~ degree	331 [303.5 ,352]
	~ 1	332.3 [305.1 ,353.3]
heterospecific	~ abundance + share pollen + func. originality	0 [0 ,0]
	~ abundance + share pollen + degree + func. originality	1.4 [0.8 ,1.9]
	~ share pollen + func. originality	9.6 [6.9 ,11.8]
	~ share pollen + degree + func. originality	11.6 [8.9 ,13.7]
	~ abundance + share pollen	15.6 [13 ,18.8]
	~ abundance + share pollen + degree	17.1 [14.4 ,20.2]
	~ share pollen	70 [63.6 ,76]
	~ share pollen + degree	71.9 [65.6 ,77.9]
	~ abundance + degree + func. originality	148.6 [129.1 ,170.5]
	~ abundance + func. originality	150.8 [130.7 ,172.8]
	~ func. originality	155.3 [135.4 ,178.2]
	~ degree + func. originality	157.3 [137.4 ,180.2]
	~ abundance + degree	172.5 [148.6 ,195.8]
	~ abundance	173.6 [150.4 ,197.5]
	~ 1	285.5 [266 ,313.5]
	~ degree	285 [267.2 ,314.5]

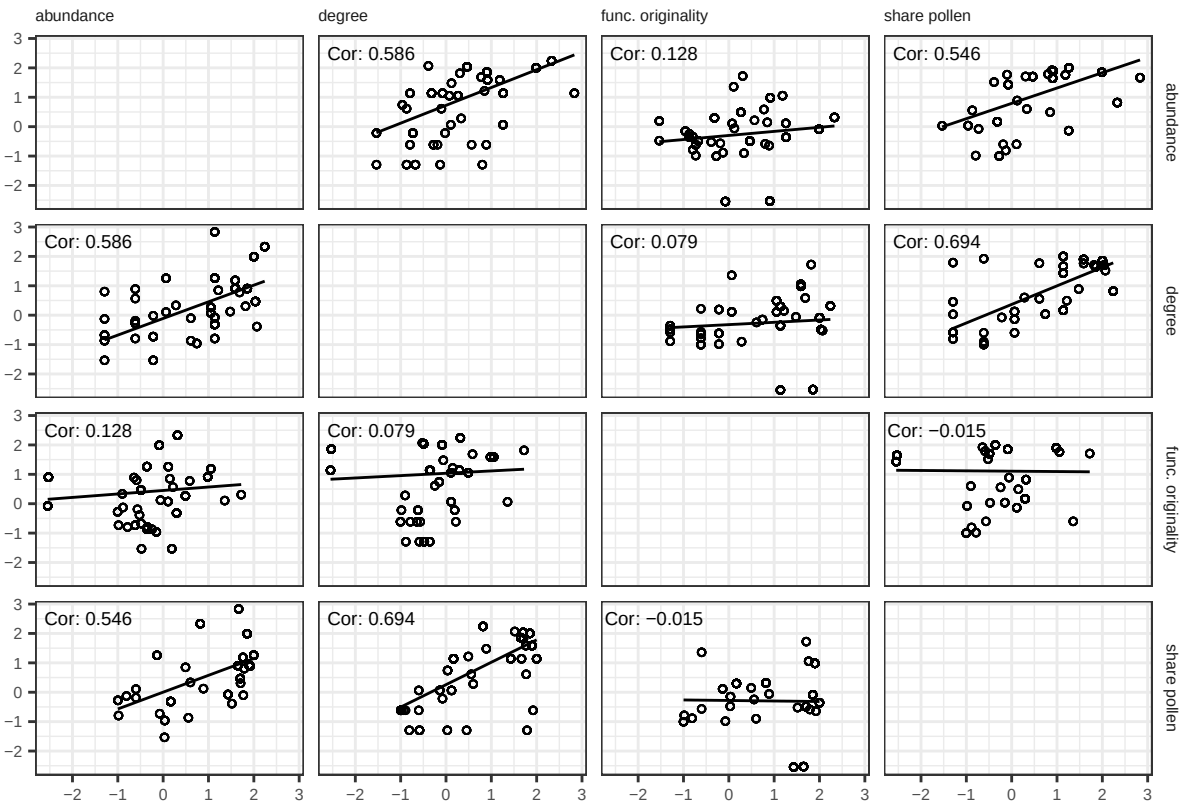

Figure S5: Corelation between the explanatory variables included in the statistical models.

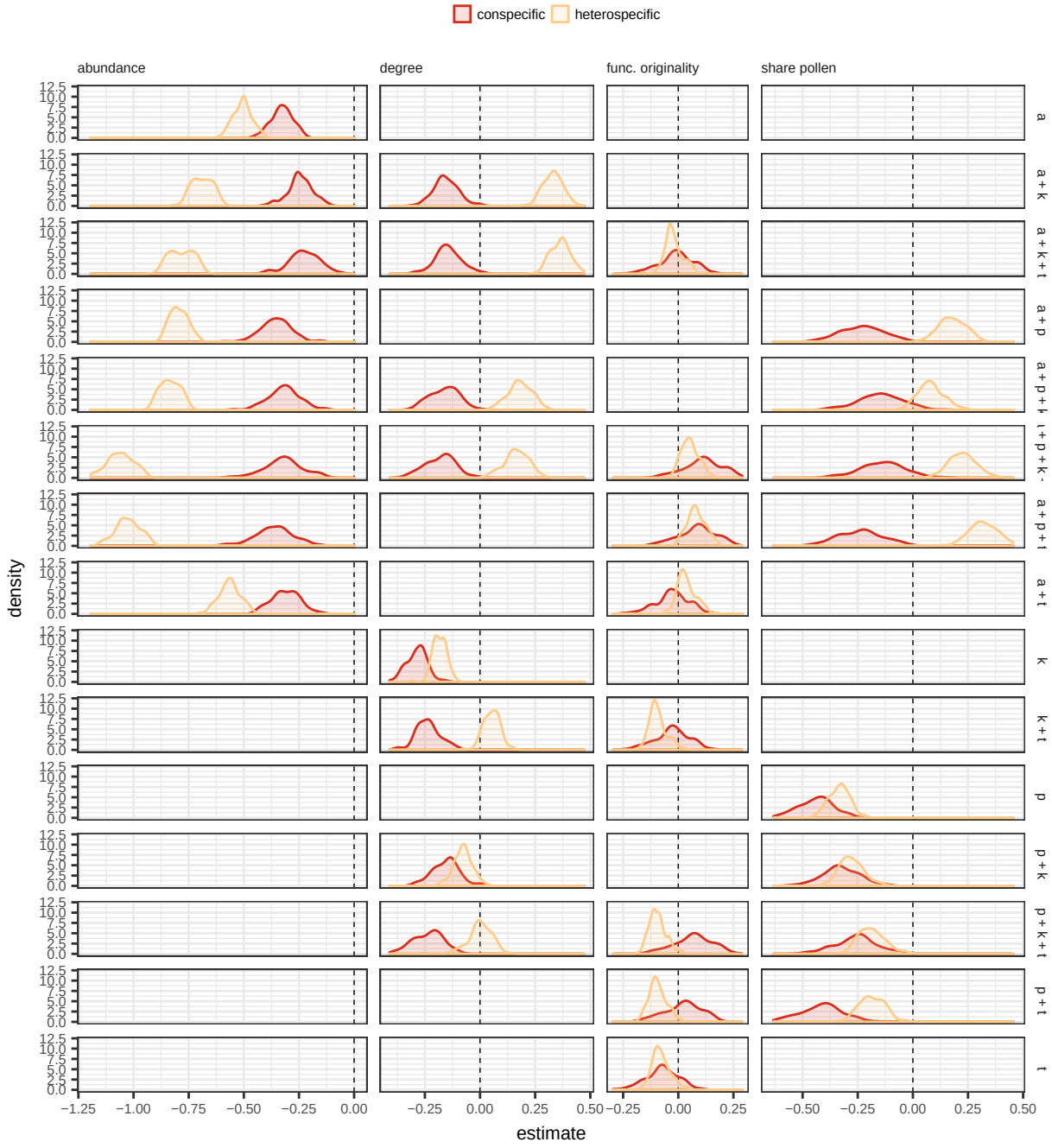

Figure S6: Distribution of effect estimates for models of conspecific and heterospecific pollen density gain. Only results for the models with the most parsimonous fixed effects.

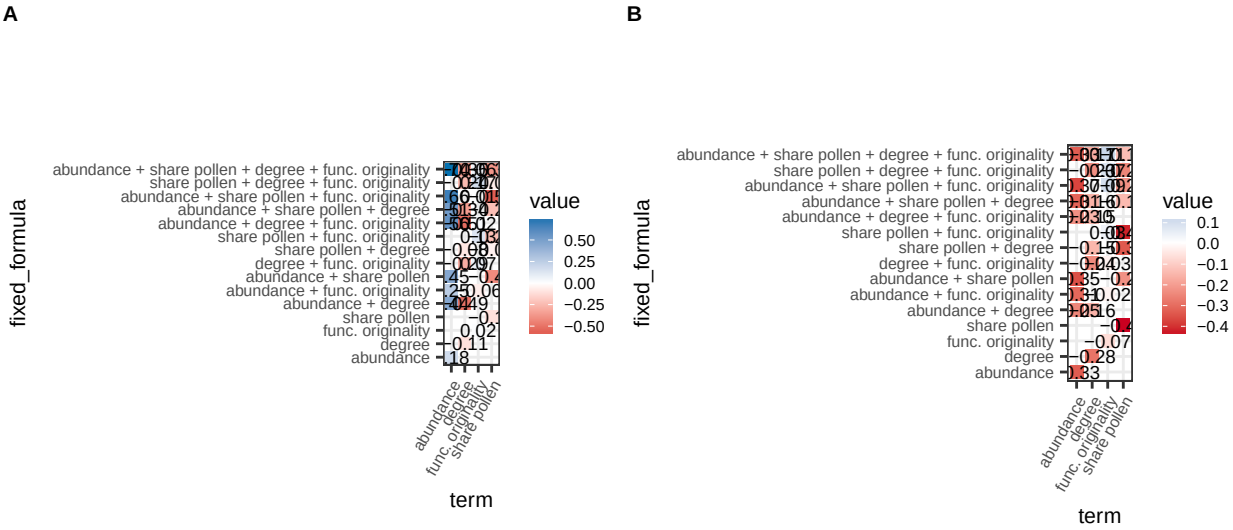

Figure S7: (#fig:fig_effect_quant_qual)asd

Chapter 1

References