ONLINE SUPPORTING INFORMATION

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APPENDIX A. Tables showing interactions and abundances, morphology and phenology to each plant and hummingbird species; the geographical coordinates of sampling transects; the results of network metrics and expected by null models; and results of model selection and parameters used to compare probabilistic models across the sampling completeness gradient.

Table A1. Abundances of 55 hummingbird-pollinated species quantified along 12000m of trails in the Atlantic Rainforest at Santa Virgínia Field Station, southeastern Brazil. Number of flowers (or inflorescences, for Asteraceae species) was counted monthly from September 2011 to August 2013 and relative abundances indicate the relative proportion of flowers accounted by each species calculated on the total number of flowers.

Species	Species Acronym	Number of flowers	Relative abundances
Aechmea cf. *organensis* Wawra	**Aec_org**	19	0.000226376
Aechmea distichantha Lem.	**Aec_dis**	106	0.001262942
Aechmea gamosepala Wittm.	**Aec_gam**	41	0.000488497
Aechmea nudicaulis (L.) Griseb.	**Aec_nud**	19	0.000226376
Aechmea vanhoutteana (Van Houtte) Mez	**Aec_van**	22	0.000262120
Alstroemeria inodora Herb.	**Als_ino**	280	0.003336074
Aphelandra colorata Wassh.	**Aph_col**	120	0.001429746
Aphelandra longiflora (Lindl.) Profice	**Aph_lon**	21	0.000250206
Besleria longimucronata Hoehne	**Bes_lon**	445	0.005301974
Billbergia amoena (Lodd.) Lindl.	**Bil_amo**	38	0.000452753
Callianthe rufinerva (A. St.-Hil.) Donnell	**Cal_ruf**	162	0.001930157
Canistrum perplexum L.B. Sm.	**Can_per**	29	0.000345522
Canna paniculata Ruiz & Pav.	**Can_pan**	289	0.003443305
Centropogon cornutus (L.) Druce	**Cen_cor**	62	0.000738702
Edmundoa lindenii (Regel) Leme	**Edm_lin**	22	0.000262120
Erythrina speciosa Andrews	**Ery_spe**	57102	0.680344569
Fuchsia regia (Vell.) Munz	**Fuc_reg**	5485	0.065351300

Inga sessilis (Vell.) Mart.	**Ing_ses**	2265	0.026986453
Justicia sp.1	**Jus_sp1**	64	0.000762531
Justicia sp.2	**Jus_sp2**	67	0.000798275
Lantana camara L.	**Lan_cam**	600	0.007148729
Macrocarpaea rubra Malme	**Mac_rub**	568	0.006767464
Manettia cordifolia Mart.	**Man_cor**	591	0.007041498
Mendoncia velloziana Mart.	**Men_sp**	18	0.000214462
Mutisia speciosa Aiton ex Hook.	**Mut_spe**	18	0.000214462
Nematanthus cf. *maculatus* (Fritsch)	**Nem_mac**		
Wiehler		19	0.000226376
Nematanthus fluminensis (Vell.) Fritsch	**Nem_flu**	373	0.004444127
Nematanthus fritschii Hoehne	**Nem_fri**	339	0.004039032
Nematanthus gregarius D.L. Denham	**Nem_gre**	300	0.003574365
Nematanthus sericeus (Hanst.) Chautems	**Nem_ser**	26	0.000309778
Nidularium innocentii Lem.	**Nid_ino**	1005	0.011974122
Nidularium longiflorum Ule	**Nid_lon**	446	0.005313889
Nidularium procerum Lindm.	**Nid_pro**	378	0.004503699
Nidularium rutilans E. Morren	**Nid_rut**	52	0.000619557
Psittacanthus dichroos (Mart.) Mart.	**Psi_dic**	56	0.000667215
Psychotria leiocarpa Cham. & Schltdl.	**Psy_lei**	8704	0.103704233
Pyrostegia venusta (Ker Gawl.) Miers	**Pyr_ven**	91	0.001084224
Sinningia cooperi (Paxton) Wiehler	**Sin_coo**	179	0.002132704
Sinningia elatior (Kunth) Chautems	**Sin_ela**	158	0.001882499
Sinningia glazioviana (Fritsch) Chautems	**Sin_gla**	146	0.001739524

Siphocampylus convolvulaceus G. Don	**Sip_con**	189	0.002251850
Siphocampylus lauroanus Handro & M. Kuhlm.	**Sip_lau**	159	0.001894413
Siphocampylus longipedunculatus E. Wimm.	**Sip_lon**	49	0.000583813
Spirotheca rivieri (Decne.) Ulbr.	**Spi_riv**	1980	0.023590807
Tillandsia dura Baker	**Til_dur**	11	0.000131060
Tillandsia geminiflora Brongn.	**Til_gem**	30	0.000357436
Tillandsia sp.	**Til_sp**	60	0.000714873
Tillandsia stricta Sol. ex Sims	**Til_str**	114	0.001358259
Vriesea carinata Wawra	**Vri_car**	359	0.004277323
Vriesea erythrodactylon (E. Morren) E. Morren ex Mez	**Vri_ery**	17	0.000202547
Vriesea incurvata Gaudich.	**Vri_inc**	110	0.001310600
Vriesea inflata (Wawra) Wawra	**Vri_inf**	65	0.000774446
Vriesea simplex (Vell.) Beer	**Vri_sim**	16	0.000190633
Vriesea sp.	**Vri_sp**	24	0.000285949
Wittrockia superba Lindm.	**Wit_sup**	23	0.000274035

Table A2. Abundances of nine hummingbird species ocurring in the Atlantic Rainforest from September 2011 to August 2013 at Santa Virgínia Field Station, southeastern Brazil. Contacts in transects indicate the total number of aural and visual contacts with individuals counted monthly across ten transects (100m each); frequency of occurrence is the proportion of days in which a species was recorded across 12000m of trails percurred and over 130 days of fieldwork; and the relative frequency is the relative proportion accounted by each species calculated on the frequency of occurences.

Species	Acronym	Contacts in transects	Frequency of occurrence	Relative frequencies
Phaethornis eurynome (Lesson. 1832)	**Pe**	86	86.923	0.288
Thalurania glaucopis (Gmelin. 1788)	**Tg**	28	78.462	0.260
Clytolaema rubricauda (Boddaert. 1783)	**Cr**	18	66.923	0.222
Leucochloris albicollis (Vieillot. 1818)	**La**	0	20.000	0.071
Stephanoxis lalandi (Vieillot. 1818)	**Sl**	0	13.077	0.066
Amazilia versicolor (Vieillot. 1818)	**Av**	0	8.462	0.043

Eupetomena macroura (Gmelin. 1788)	**Em**	0	0.769	0.028
Lophornis chalybeus (Vieillot. 1822)	**Lc**	1	5.385	0.018
Florisuga fusca (Vieillot. 1817)	**Ff**	5	21.538	0.003

Table A3. Plant phenology quantified by the monthly presence/absence of flowers of 55 hummingbird-pollinated species from September 2011 to August 2013 in the 12000 m of trails in the Atlantic Rainforests at Santa Virgínia Field Station. southeastern Brazil. Species acronym according Table A1. In total. 130 days of sampling were spread along the years.

	2011				2012													
Species acronym	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Aec_dis	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	1	1
Aec_gam	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
Aec_nud	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0
Aec_org	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Aec_van	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
Als_ino	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	1	1
Aph_col	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0
Aph_lon	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Bes_lon	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0
Bil_amo	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
Cal_ruf	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Can_pan	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0
Can_per	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Cen_cor	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
Edm_lin	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1
Ery_spe	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0

Fuc_reg	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ing_ses	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1
Jus_sp1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Jus_sp2	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Lan_cam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mac_rub	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0
Man_cor	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0
Men_sp	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0
Mut_spe	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0
Nem_flu	1	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0
Nem_fri	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0
Nem_gre	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0
Nem_mac	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Nem_ser	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Nid_ino	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1
Nid_lon	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0
Nid_pro	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Nid_rut	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0
Psi_dic	0	0	0	0	1	1	1	1	0	0	0	0	0	0	1	1	1	1
Psy_lei	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1	1	1	0
Pyr_ven	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Sin_coo	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Sin_ela	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	1	1

Sin_gla	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1
Sip_con	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sip_lau	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0
Sip_lon	0	0	0	1	0	0	1	0	0	1	1	0	1	0	1	1	1	1
Spi_riv	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0
Til_dur	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Til_gem	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Til_sp	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Til_str	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Vri_car	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0
Vri_ery	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0
Vri_inc	0	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1
Vri_inf	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	1	1
Vri_sim	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Vri_sp	0	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	1	0
Wit_sup	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1

Table A4. Hummingbird phenology indicated by the monthly presence/absence of flowers from September 2011 to August 2013 in the 12000 m of trails in the Atlantic Rainforests at Santa Virgínia Field Station. southeastern Brazil. Species acronym according Table A2.

Species acronym	2011				2012											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Pe	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tg	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cr	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
La	0	1	1	0	1	1	0	0	0	0	0	1	0	1	1	1	1
Sl	0	1	1	0	0	1	0	0	0	0	0	0	1	1	1	0	1
Av	0	1	0	1	0	0	0	1	0	1	0	0	1	1	0	1	0
Em	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Lc	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0

Ff	0	0	0	1	0	1	0	0	0	0	0	0	0	1	1	1	1

Table A5. Minimum corolla depth in 55 hummingbird-pollinated species in Atlantic Rainforests from September 2011 to August 2013 in the 12000 m of trails in the Atlantic Rainforest at Santa Virgínia Field Station. southeastern Brazil. Corolla depth was measured as the internal distance from the base of nectar chamber to the distal portion of the flower (*i.e.* effective corolla length. *sensu* Wolf. Stiles & Hainsworth 1976). which represents the minimum mouth apparatus length needed to a hummingbird access the nectar legitimately. Species acronym according Table A1.

Species acronym	Minimum corolla depth (cm)	Mean ± sd corolla depth (cm)
Aec_dis	1.22	1.29 ± 0.07 (n=3)
Aec_gam	0.85	1.08 ± 0.23 (n=8)
Aec_nud	0.96	1.06 ± 0.10 (n=3)
Aec_org	1.04	1.21 ± 0.17 (n=4)
Aec_van	0.93	1.09 ± 0.16 (n=10)
Als_ino	1.00	1.00 (n=1)
Aph_col	3.24	3.38 ± 0.14 (n=10)
Aph_lon	3.06	3.28 ± 0.22 (n=13)
Bes_lon	1.06	1.30 ± 0.24 (n=20)
Bil_amo	3.28	3.70 ± 0.42 (n=6)
Cal_ruf	0.38	0.58 ± 0.20 (n=3)
Can_pan	2.93	3.49 ± 0.56 (n=3)
Can_per	1.49	1.57 ± 0.08 (n=5)
Cen_cor	3.36	3.67 ± 0.31 (n=5)
Edm_lin	1.09	1.71 ± 0.62 (n=2)

Ery_spe	0.9	1.04 ± 0.14 (n=11)
Fuc_reg	1.37	1.58 ± 0.21 (n=9)
Ing_ses	1.11	1.59 ± 0.48 (n=3)
Jus_sp1	2.69	2.88 ± 0.19 (n=9)
Jus_sp2	0.95	1.16 ± 0.21 (n=15)
Lan_cam	0.61	0.66 ± 0.05 (n=5)
Mac_rub	2.14	2.34 ± 0.20 (n=17)
Man_cor	4.57	5.14 ± 0.57 (n=12)
Men_sp	3.06	3.23 ± 0.17 (n=4)
Mut_spe	1.26	1.46 ± 0.20 (n=5)
Nem_flu	3.97	4.30 ± 0.33 (n=9)
Nem_fri	3.78	3.94 ± 0.16 (n=9)
Nem_gre	1.38	1.52 ± 0.14 (n=7)
Nem_mac	4.26	4.37 ± 0.11 (n=5)
Nem_ser	2.75	3.08 ± 0.33 (n=4)
Nid_ino	4.29	4.62 ± 0.33 (n=16)
Nid_lon	4.44	4.66 ± 0.22 (n=8)
Nid_pro	3.56	4.20 ± 0.64 (n=9)
Nid_rut	3.19	3.57 ± 0.38 (n=3)
Psi_dic	1.44	1. 44 (n=1) (n=1)
Psy_lei	0.6	0.66 ± 0.06 (n=20)
Pyr_ven	1.75	2.04 ± 0.29 (n=8)
Sin_coo	2.63	2.88 ± 0.25 (n=6)
Sin_ela	2.76	3.04 ± 0.28 (n=2)

Sin_gla	3.08	3.19 ± 0.11 (n=11)
Sip_con	3.14	3.49 ± 0.35 (n=6)
Sip_lau	3.92	4.10 ± 0.18 (n=4)
Sip_lon	3.19	3.88 ± 0.29 (n=5)
Spi_riv	0.33	0.67 ± 0.34 (n=3)
Til_dur	1.36	1.50 ± 0.14 (n=8)
Til_gem	1.20	1.26 ± 0.06 (n=5)
Til_sp	1.20	1.20 (n=1)
Til_str	1.45	1.52 ± 0.07 (n=11)
Vri_car	3.14	3.49 ± 0.35 (n=11)
Vri_ery	4.28	4.28 (n=1)
Vri_inc	3.22	3.55 ± 0.33 (n=6)
Vri_inf	3.39	3.66 ± 0.27 (n=8)
Vri_sim	3.35	3.62 ± 0.27 (n=6)
Vri_sp	3.35	3.80 ± 0.45 (n=3)
Wit_sup	1.43	1.85 ± 0.42 (n=8)

Table A6. Bill length (exposed culmen). estimated tongue extension and bill+tongue estimation of nine hummingbird species in the Atlantic Rainforest at Santa Virgínia Field Station. southeastern Brazil. *Tongue extension estimated based on *Selasphorus rufus* measures. which is around 80% percent of the bill length (Grant & Temeles 1992). Species acronym according to Table A2.

Species acronym	Mean bill length ± sd (cm)	Tongue extension (cm)*	Bill + tongue
Pe	3.33 ± 0.12 (n=12)	2.72	6.12
Tg	1.79 ± 0.08 (n=6)	1.44	3.24
Cr	1.90 (n=1)	1.52	3.42
La	2.02 ± 0.14 (n=10)	1.60	3.60
Sl	1.45 ± 0.12 (n=8)	1.20	2.70
Av	1.61 ± 0.08 (n=8)	1.28	2.88
Em	2.23 ± 0.13 (n=7)	1.76	3.96
Lc	1.08 ± 0.10 (n=6)	0.96	2.16
Ff	2.16 ± 0.11 (n=7)	1.76	3.96

Table A7. Geographical coordinates of starting and ending points from the ten transects (100 m long) where we counted hummingbirds monthly at Santa Virgínia Field Station. southeastern Brazil.

	Starting point	**Ending point**
Transect 1	S 23º20.299. W 45º08.965	S 23º20.313. W 45º09.020
Transect 2	S 23º20.430. W 45º09.332	S 23º20.486. W 45º09.353
Transect 3	S 23º20.575. W 45º09.318	S 23º20.658. W 45º09.337
Transect 4	S 23º20.658. W 45º09.356	S 23º20.693. W 45º09.390
Transect 5	S 23º20.744. W 45º09.487	S 23º20.786. W 45º09.470
Transect 6	S 23º20.844. W 45º09.448	S 23º20.885. W 45º09.457
Transect 7	S 23º20.968. W 45º09.397	S 23º20.981. W 45º09.344
Transect 8	S 23º20.994. W 45º09.004	S 23º20.979. W 45º08.942
Transect 9	S 23º20.767. W 45º09.806	S 23º20.747. W 45º08.765
Transect 10	S 23º20.932. W 45º09.265	S 23º20.949. W 45º09.218

Table A8. Number of parameters used to penalize model complexity in each of eight models described in ESM 12. These numbers of parameters were defined according to number of plant and animal species in the matrix and to number of variables included in the models. Smaller networks tend to be easier to predict. so the number of species in the matrices was included in the model's penalization to account for the increasing network size along the sampling effort gradient.

Models	Cumulative sampling effort (hours)									
	1	**2**	**3**	**4**	**5**	**10**	**15**	**20**	**25**	**30**
PM	86	98	100	110	112	124	126	126	126	126
P	43	49	50	55	56	62	63	63	63	63
M	43	49	50	55	56	62	63	63	63	63
Null	1	1	1	1	1	1	1	1	1	1
AM	86	98	100	110	112	124	126	126	126	126
A	43	49	50	55	56	62	63	63	63	63
AP	86	98	100	110	112	124	126	126	126	126
APM	129	147	150	165	168	186	189	189	189	189

Table A9. Network metrics over increasing sampling completeness in the hummingbird-plant network in Santa Virgínia. Between parenthesis are shown values expected by the null model (95% confidence interval) and bold indicates significant differences between observed and expected by the null model.

Metric	Cummulative sampling effort (hours observing each plant sp							
	m1	**m5**	**m10**	**m15**	**m20**	**m25**	**m30**	**m35**

N. plants	36	47	53	54	54	54	54	55
N. pollinators	7	9	9	9	9	9	9	9
Links	44	68	81	94	102	105	111	115
Visits	83	466	812	1,083	1,437	1,719	2,011	2,282
Connectance	0.17	0.17	0.17	0.19	0.21	0.27	0.23	0.23
Interaction evenness	**0.93 (0.62-0.66)**	**0.85 (0.56-0.59)**	**0.83 (0.56-0.59)**	**0.83 (0.59-0.62)**	**0.84 (0.62-0.64)**	**0.84 (0.63-0.65)**	**0.85 (0.63-0.66)**	**0.85 (0.64-0.66)**
NODF	17.05 (21.54-22.15)	**28.92 (23.25-23.65)**	**32.71 (25.47-26.06)**	**44.92 (30.05-30.52)**	**49.43 (31.65-32.12)**	**51.62 (32.18-32.68)**	**58.00 34.57-35.05)**	**59.63 (35.02-35.52)**
wNODF	**13.05 (4.10-12.47)**	15.37 (17.10-26.60)	15.07 20.50-30.43)	19.29 (27.70-38.50)	22.73 (32.80-44.50)	24.17 (34.20-46.20)	26.90 (36.50-49.90)	29.13 (38.00-49.90)
H_2'	0.70 (0.55-0.77)	**0.61 (0.27-0.50)**	**0.60 (0.23-0.39)**	**0.55 (0.18-0.28)**	**0.53 (0.16-0.24)**	**0.52 (0.15-0.24)**	**0.48 (0.14-0.21)**	**0.48 (0.13-0.20)**
Q binary	0.54 (0.45-0.54)	0.48 (0 25-0.48)	0.43 (0.20-0.43)	0.38 (0.30-0.40)	0.38 (0.31-0.39)	0.37 (0.32-0.39)	0.36 (0.34-0.37)	0.35 (0.32-0.36)
Q quantitative	**0.63 (0.15-0.61)**	**0.51 (0.03-0.16)**	**0.49(0.03-0.15)**	**0.48 (0.03-0.16)**	**0.45 (0.03-0.15)**	**0.44 (0.03-0.15)**	**0.43 (0.03-0.15)**	**0.42 (0.03-0.14)**

N modules quantitative	5	3 or 4	3 or 4	4	4	4	4	4

Table A10. AIC values indicating the ability of eight models to predict observed frequency of interaction between pairwise species over increasing sampling effort in the Santa Virgínia hummingbird-plant network. Models are probability matrices based on species abundance (**A**). phenological overlap (**P**) and morphological matching (**M**) and all possible combination among them. **Null** model is a benchmark model that assumes all interactions have the same probability to occur. Note that **Null** is the best predictive model under very small sampling (<2h). but after 3h of cumulative sampling the **PM** model. which includes both phenological overlap and bill-corolla (morphological) matching. had the best ability to predict pairwise interaction. Also note that all models including **A** had the worst fits. even worse than the **Null** model. Because data on tongue extension in hummingbirds is scarce in the literature. we also recreate a morphological model (***M1***) considering the tongue extension as 1/3 of the bill length. However. these models presented minor influence on the results because they performed similarly to the model **M**; thus we discussed just model **M** in the text.

	Cumulative sampling effort (hours)										
Models	**1**	**2**	**3**	**4**	**5**	**10**	**15**	**20**	**25**	**30**	
PM	531	885	1,168*	1,623*	2,015*	3,313*	4,201*	5,211*	6,003*	6,660*	7
P	482	860	1,178	1,684	2,130	3,613	4,638	5,832	6,771	7,579	8
M	474	862	1,192	1,833	2,348	4,004	5,025	6,252	7,229	8,180	9
M1	441	795	1,073	1,658	2,115	3,545	4,415	5,444	6,262	7,048	7
Null	431*	842*	1,214	1,918	2,495	4,330	5,509	6,935	8,071	9,185	1

AM	870	1,441	1,880	2,464	3,037	4,964	6,804	8,827	10,509	12,281	1
A	787	1,351	1,792	2,370	2,949	4,884	6,737	8,779	10,475	12,263	1
AP	896	1,508	1,959	2,509	3,069	5,004	6,931	9,089	10,685	12,634	1
APM	979	1,598	2,047	2,602	3,159	5,082	6,996	9,134	10,984	12,760	1

Table A11. Plant-hummingbird network from Atlantic Rainforest at Santa Virgínia Field Station. southeastern Brazil assembled with 50h of observation to each plant species (see detail in 'Materials and Methods' for detail). Plant and hummingbirds species names follow Table A1 and A2. respectively.

	Pe	Tg	Cr	Ff	La	Sl	Av	Lc	Em
Aec_dis	15	21	1	0	0	0	0	0	0
Aec_gam	18	95	6	0	0	2	0	0	0
Aec_nud	1	6	15	0	0	0	0	0	0
Aec_org	12	24	0	0	0	0	0	0	0
Aec_van	95	132	0	0	0	0	0	0	0
Als_ino	30	0	0	0	2	18	0	0	0
Aph_col	18	0	0	0	0	0	0	0	0
Aph_lon	31	0	0	0	0	0	0	0	0
Bes_lon	9	19	0	0	0	0	0	0	0
Bil_amo	36	0	0	0	0	0	0	0	0
Cal_ruf	1	22	60	0	0	0	0	0	0
Can_pan	65	0	0	0	0	0	0	0	0
Can_per	14	68	18	1	0	0	0	0	0
Cen_cor	23	0	0	0	0	0	0	0	0
Edm_lin	53	26	0	0	0	0	0	0	0
Ery_spe	107	137	95	0	0	0	1	5	1
Fuc_reg	6	5	15	0	0	0	0	0	0
Ing_ses	44	32	198	41	23	0	8	2	0
Jus_sp1	7	0	0	0	0	0	0	0	0
Jus_sp2	5	0	0	0	0	0	0	0	0
Lan_cam	1	0	0	0	0	26	0	0	0
Mac_rub	6	33	2	0	1	6	30	0	0
Man_cor	50	0	0	0	0	0	0	0	0
Men_sp	2	0	14	0	0	0	16	0	0
Mut_spe	62	0	0	0	14	0	0	0	0

Nem_flu	22	0	0	0	0	0	0	0	0
Nem_fri	36	0	0	0	0	0	0	0	0
Nem_gre	4	18	0	0	0	0	0	0	0
Nem_mac	15	0	0	0	0	0	0	0	0
Nem_ser	5	1	4	0	0	0	0	0	0
Nid_ino	36	0	2	0	0	0	0	0	0
Nid_lon	11	0	0	0	0	0	0	0	0
Nid_pro	31	0	0	0	0	0	0	0	0
Nid_rut	20	0	1	0	0	0	0	0	0
Psi_dic	1	1	53	1	10	0	1	0	0
Psy_lei	0	2	0	0	0	0	1	0	0
Pyr_ven	17	1	0	0	1	0	0	0	0
Sin_coo	35	0	0	0	0	0	0	0	0
Sin_ela	7	0	0	0	9	0	0	0	0
Sin_gla	4	0	0	0	0	0	0	0	0
Sip_con	22	1	0	0	0	0	0	0	0
Sip_lau	4	0	0	0	0	0	0	0	0
Sip_lon	7	0	0	0	0	0	0	0	0
Spi_riv	0	74	102	4	0	0	0	5	0
Til_dur	1	0	0	0	0	0	0	0	0
Til_gem	2	12	2	0	1	1	0	0	0
Til_sp	2	4	1	0	0	0	0	0	0
Til_str	1	3	1	0	0	1	0	0	0
Vri_car	16	0	0	0	0	0	0	0	0
Vri_ery	17	0	0	0	0	0	0	0	0
Vri_inc	22	0	0	0	0	0	0	0	0
Vri_inf	9	0	0	0	0	0	0	0	0
Vri_sim	24	0	0	0	0	0	0	0	0
Vri_sp	20	0	0	0	0	0	0	0	0
Wit_sup	55	77	0	0	0	0	0	0	0

APPENDIX B. Figures showing the asymptotic trend of links in a rarefaction and the correlation between hummingbird species abundances and their frequencies of occurrences.

Figure B1. Individual-based rarefaction curve with 95% confidence intervals (grey lines). Note the asymptotic tendency from accumulated number of links with the accumulation of visits observed in the network. We ran this analysis in EstimateS 9.1.0 (Colwell 2013) and calculated confidence intervals using unconditional variances as suggested by Colwell et al. (2012. doi:10.1093/jpe/rtr044)

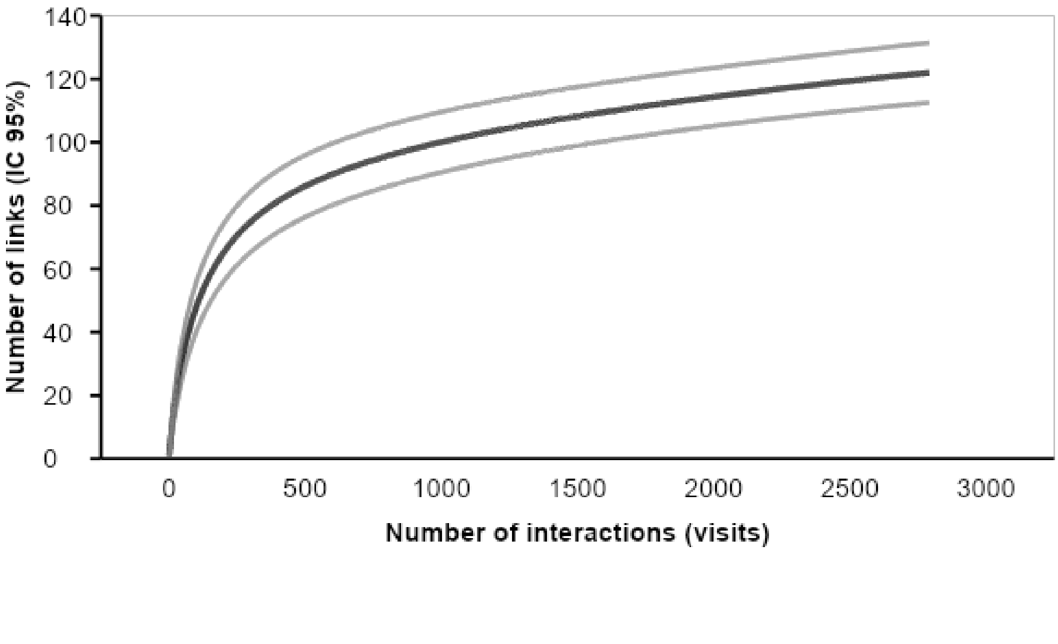


Figure B2. Spearman correlation between frequency of occurrence during 130 days of field work and number of contacts during counts in transects. Observations were conducted over a 2 year period and include nine hummingbird species from Santa Virgínia Field Station. southeastern Brazil.

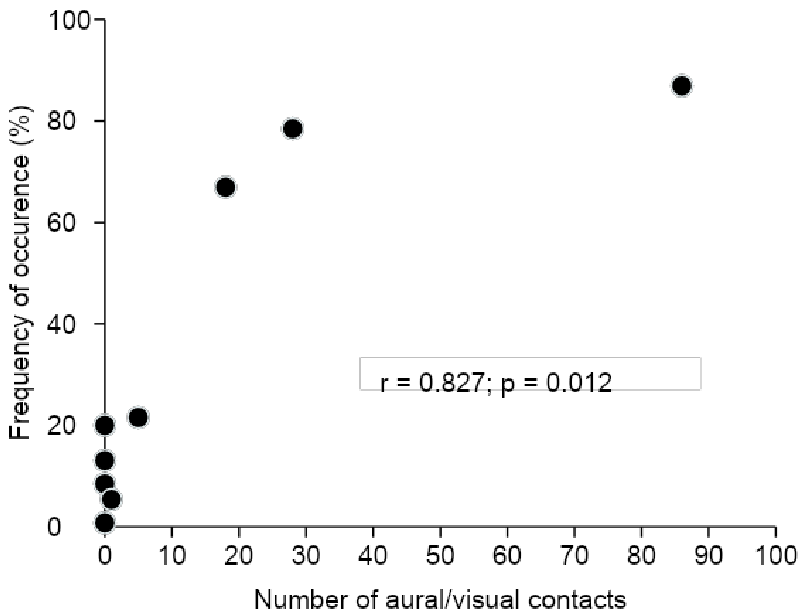
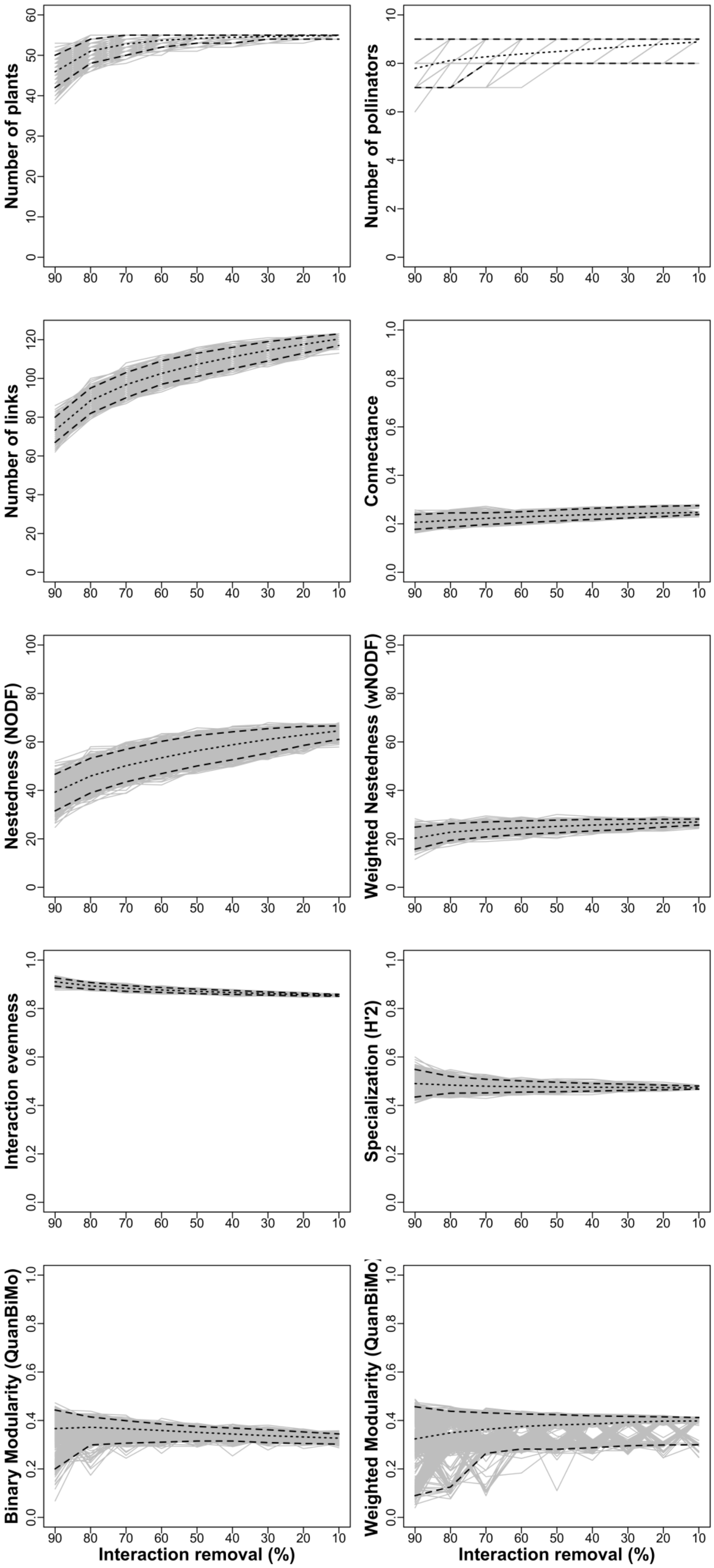


Figure B3. Network metrics calculated under a simulated sampling effort gradient created by interaction removals of a plant-hummingbird network in SE Brazil. We simulated rarefaction-like sampling reduction by removing successively 10% of interactions creating class of removal from 90% to 10% removals. Network metrics were recalculated (1.000 iterations) and their values (gray overlapped lines) and mean (black line) were plotted. Dashed black lines indicate mean and 95% CI. Note that the results do not differ importantly from Figure 1 but metrics were less variable across the gradient of sampling effort using this approach.


Number of plants
Number of pollinators
Number of links
Connectance
Nestedness (NODF)
Weighted Nestedness (wNODF)
Interaction evenness
Specialization (H'2)
Binary Modularity (QuanBiMo)
Weighted Modularity (QuanBiMo)
Interaction removal (%)
Interaction removal (%)