Oikos

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Appendix 1

Table A1. Dataset including the code, reference, locality, latitude, habitat, data collection method, number of plant and pollinator species and number of solitary (S), possibly communal (C), primitively eusocial (P) and highly eusocial (E) hymenopteran species (excluding ants). Network source is specified together with code as: a = Interaction Web Database, b = Web of Life Database, and c = sourced from the original paper. Method: A = flower observations, B = timed flower observations, C = pollen load.

Code	Reference	Locality	Latitude	Habitat	Method	Pla.	Pol.	S	C	P	E
N1[a]	Barrett and Helenurm 1987	Canada	46°35'N; 66°08'W	Boreal forest	A	12	102	28	0	7	1
N2[b]	Bartomeus et al. 2008	Spain	42°19'N; 3°18'W	Mediterranean shrubland	A	32	81	23	1	1	2
N3[a]	Bezerra et al. 2009	Brazil	8°24'S; 37°09'W	Caatinga	A	13	13	10	2	0	1
N4[b]	Dicks et al. 2002 – Hickling	United Kingdom	52°45'N; 1°34'E	Hay meadow	A	17	61	6	0	6	0

N5 [a]	Elberling andOlesen 1999	Sweden	68°21’N; 18°30’E	Alpine subarctic community	A	23	118	21	0	2	0
N6 [b]	Ingversen 2006	Dominica	15°31’N; 61°28’W	-	-	31	43	0	1	0	1
N7 [b]	Ingversen 2006	Jamaica	18°21’N; 77°38’W	-	-	29	43	4	2	0	2
N8 [b]	Inoue 1990	Japan	35°10’N; 135°52’E	Temperate forest	A	114	878	104	1	9	11
N9 [a]	Inouye and Pyke 1988	Australia	36°25’S; 148°20’E	Montane forest	B	42	91	18	5	0	1
N10 [c]	Junker et al. 2013	Germany	49°46’N; 9°58’E	Fallow land	A	53	248	16	1	17	2
N11 [b]	Kaiser-Bunbury et al. 2009 – 1	Mauritius	20°41’S; 57°43’E	Invaded heathland	B	17	39	1	0	0	2
N12 [b]	Kaiser-Bunbury et al. 2009 – 2	Mauritius	20°41’S; 57°43’E	Restored heathland	B	33	54	1	0	0	2
N13 [b]	Kaiser-Bunbury	Seychelles	4°40’S;	Dwarf forest	B	11	34	6	0	0	2

	et al. 2017 –Tro5		55°25’E								
N14 [b]	Kakutani et al. 1990	Japan	35°1’N; 135°46’E	University Campus	B	113	314	74	2	5	9
N15 [a]	Kato et al. 1990	Japan	35°21’N; 135°45’E	Beech forest	A	91	679	156	0	9	5
N16 [b]	Kato et al. 1993	Japan	35°58’N; 138°38’E	Temperate forest/meadow	A	91	360	26	0	9	6
N17 [b]	Kato 2000	Japan	28°22’N; 129°29’E	Several	A	110	607	32	1	0	6
N18 [b]	Kato and Miura 1996	Japan	35°38’N; 136°4’E	Lowland marsh	A	64	191	35	1	3	6
N19 [b]	Memmott 1999	United Kingdom	51°34’N; 2°35’W	Grassland	A	25	79	0	0	5	1
N20 [a]	Mosquin and Martin 1967	Canada	75°N; 114°58’W	Arctic Community	A	11	18	0	0	1	0
N21 [a]	Motten 1982	USA	36°1’N; 78°59’W	Deciduous Forest	A; C	13	44	28	0	4	1

N22 [a]	Olesen et al. 2002 – 1	Mauritius	9°24’S; 46°28’E	Coastal forest	A	14	13	1	1	0	1
N23 [a]	Olesen et al. 2002 – 2	Azores	39°27’N; 31°11’W	Open herb Community	A	10	12	1	0	1	1
N24 [a]	Ollerton et al. 2003	South Africa	29°37’S; 30°08’E	Upland Grassland	A; C	9	56	4	0	0	1
N25 [c]	Orford et al. 2016	United Kingdom	51°7’N; 2°19’W	Grassland	A	20	66	3	0	7	1
N26 [a]	Schemske et al. 1978	USA	40°6’N; 88°11’W	Maple–oak Woodland	A	7	32	16	0	5	0
N27 [a]	Small 1976	Canada	45°23’N; 75°30’W	Peat bog	B	13	34	8	0	6	1
N28 [b]	Vázquez 2002	Argentina	41°4’S; 71°31’W	Evergreen montane forest	B	14	90	18	1	2	1
N29 [c]	Weiner et al. 2011	Germany	48°18’N; 9°21’E	Grassland	A	82	517	81	0	19	10

Table A2. List of all hymenopteran species, their family, level of sociality, authority and year when available and reference for sociality classification. Code for sociality level: S = solitary, C = communal, P = primitively eusocial, E = highly eusocial. Species with poor identification (PoorID), unknown social behaviour (Unk) or that express more than one behaviour were excluded from analysis. Code for references: A = Cronin, A. L. and Hirata, M. 2003. Social polymorphism in the sweat bee *Lasioglossum (Evylaeus) baleicum* (Hymenoptera, Halictidae) in Hokkaido, northern Japan. - Insectes Soc. 50: 379–386, B = Camillo, E. and Garofalo, C. A. 1989. Social organization in reactivated nests of three species of *Xylocopa* (Hymenoptera, Anthophoridae) in southeastern Brasil. - Insectes Soc. 36: 92–105, C = Danforth, B. N. et al. 2003. Phylogeny of eusocial *Lasioglossum* reveals multiple losses of eusociality within a primitively eusocial clade of bees (Hymenoptera: Halictidae). - Syst. Biol. 52: 23–36, D = Engel, M. S. 2000. Classification of the bee tribe Augochlorini (Hymenoptera, Halictidae). - Bull. AMNH, E = Falk, S. and Lewington, R. 2015. Field guide to the bees of Great Britain and Ireland. - British Wildlife Publishing, F = Hölldobler, B. and Wilson, E. O. 1990. The ants. - Harvard Univ. Press, G = Hunt, J. H. 2007. The evolution of social wasps. - Oxford Univ. Press., H = Michener, C. D. 2007. The bees of the world. - The Johns Hopkins Univ. Press, I = Putra, R. E. and Nakamura, K. 2009. Foraging ecology of a local wild bee community in an abandoned Satoyama system in Kanazawa, central Japan. - Entomol. Res. 39: 99–106, J = Richards, M. H. 2011. Colony social organisation and alternative social strategies in the eastern carpenter bee, *Xylocopa virginica*. - J. Insect Behav. 24: 399–411, K = Sakagami, S. F. et al. 2011. Bionomic notes on the social halictine bee *Lasioglossum affine* (Hymenoptera, Halictidae). – Esakia 19: 161–176, L = Stockhammer, K. A. 1967. Some notes on the biology of the blue sweat bee, *Lasioglossum coeruleum* (Apoidea: Halictidae). - J. Kans. Entomol. Soc. 40: 177–189, M = Yagi, N. and Hasegawa, E. 2012. A halictid bee with sympatric solitary and eusocial nests offers evidence for Hamilton's rule. - Nat. Commun. 3: 939.

Family	Species	Authority	Soc.	Ref.
Braconidae	"Agathidinae" sp	-	S	G
Braconidae	"Alysiinae" sp	-	S	G
Tiphiidae	"Anthoboscinae" sp	-	S	G
Apidae	"Apidae" sp	-	PoorID	-
Aulacidae	"Aulacidae" sp	-	S	G
Braconidae	"Braconidae" sp	-	S	G
-	"Chalcidoidae" sp	-	S	G
Cynipidae	"Cynipidae" sp	-	S	G
Diapriidae	"Diapriidae" sp	-	S	G
Eulophidae	"Eulophidae" sp	-	S	G
Pergidae	"Euryinae" sp	-	S	G
Eurytomidae	"Eurytomidae" sp	-	S	G
Figitidae	"Figitidae" sp	-	S	G
Formicidae	"Formicidae" sp	-	E	F
Halictidae	"Halictidae" sp	-	PoorID	-
-	"Hymenoptera" sp	-	PoorID	-
Ichneumonidae	"Ichneumonidae" sp	-	S	G
Ichneumonidae	"Orthocentrinae" sp	-	S	G
Platygastridae	"Platygastridae" sp	-	S	G
Pompilidae	"Pompilidae" sp	-	S	G

Proctotrupidae	"Proctotrupidae" sp	-	S	G
Pteromalidae	"Pteromalidae" sp	-	S	G
Sphecidae	"Sphecidae" sp	-	S	G
Tenthredinidae	"Tenthredinidae" sp	-	S	G
Eulophidae	"Tetrastichinae" sp	-	S	G
Vespidae	"Vespidae" sp	-	E	G
Vespidae	"Vespinae" sp	-	E	G
Cimbicidae	*Abia akebiae*	Takeuchi	S	G
Cimbicidae	*Abia americana*	Cresson, 1880	S	G
Cimbicidae	*Abia candens*	Konow, 1887	S	G
Cimbicidae	*Abia sericea*	Linnaeus	S	G
Ichneumonidae	*Aclastus* sp	-	S	G
Halictidae	*Agapostemon* sp	-	C	H
Braconidae	*Agathis* sp	-	S	G
Tenthredinidae	*Aglaostigma (Macrophyopsis) nebulosum*	André, 1881	S	G
Tenthredinidae	*Allantus nigrocaeruleus*	Smith, 1874	S	G
Tenthredinidae	*Alphostrombocerus konowi*	Jakovlev, 1892	S	G
Crabronidae	*Alysson cameroni*	Yasumatsu and Masuda, 1932	S	H
Apidae	*Amegilla dulcifera subflavescens*	Cockerell, 1926	S	H
Apidae	*Amegilla femorata*	Sichel, 1869	S	H
Sphecidae	*Ammophila clavus*	Fabricius, 1775	S	G
Sphecidae	*Ammophila infesta*	Smith, 1873	S	G
Vespidae	*Ancistrocerus claripennis*	Smith, 1873	S	G
Vespidae	*Ancistrocerus melanocerus*	Dalla Torre	S	G
Vespidae	*Ancistrocerus* sp	-	S	G
Andrenidae	*Andrena aburana*	Hirashima, 1962	S	H
Andrenidae	*Andrena akitsushimae*	Tadauchi and Hirashima, 1984	S	H
Andrenidae	*Andrena alleghaniensis*	Viereck, 1907	S	H
Andrenidae	*Andrena amamiensis*	Hirashima, 1960	S	H
Andrenidae	*Andrena arabis*	Robertson, 1897	S	H
Andrenidae	*Andrena benefica*	Hirashima, 1962	S	H
Andrenidae	*Andrena bicolor*	Fabricius, 1775	S	H
Andrenidae	*Andrena bradleyi*	Viereck, 1907	S	H
Andrenidae	*Andrena brassicae*	Hirashima, 1957	S	H
Andrenidae	*Andrena brevihirtiscopa*	Hirashima, 1962	S	H
Andrenidae	*Andrena carlini*	Cockerell, 1901	S	H
Andrenidae	*Andrena carolina*	Viereck, 1909	S	H
Andrenidae	*Andrena ceanothi*	Viereck, 1917	S	H
Andrenidae	*Andrena cressoni*	Robertson, 1891	S	H
Andrenidae	*Andrena dentata*	Smith, 1879	S	H
Andrenidae	*Andrena dorsata*	Kirby, 1802	S	H
Andrenidae	*Andrena dunningi*	Cockerell, 1898	S	H
Andrenidae	*Andrena edashigei*	Hirashima, 1960	S	H
Andrenidae	*Andrena erigeniae*	Robertson, 1891	S	H
Andrenidae	*Andrena erythronii*	Robertson, 1891	S	H
Andrenidae	*Andrena esakki*	Hirashima, 1957	S	H
Andrenidae	*Andrena forbesii*	Robertson, 1891	S	H
Andrenidae	*Andrena fucata*	Smith, 1847	S	H
Andrenidae	*Andrena fulvago*	Christ, 1791	S	H
Andrenidae	*Andrena haemorrhoa*	Fabricius, 1781	S	H
Andrenidae	*Andrena halictoides*	Smith, 1869	S	H
Andrenidae	*Andrena hattorfiana*	Fabricius, 1775	S	H
Andrenidae	*Andrena hebes*	Pérez, 1905	S	H
Andrenidae	*Andrena hikosana*	Hirashima, 1957	S	H
Andrenidae	*Andrena hirashimai*	Tadauchi, 1985	S	H
Andrenidae	*Andrena imitatrix*	Cresson, 1872	S	H
Andrenidae	*Andrena ishiharai*	Hirashima, 1953	S	H
Andrenidae	*Andrena japonica*	Smith, 1873	S	H
Andrenidae	*Andrena kaguya*	Hirashima, 1965	S	H
Andrenidae	*Andrena knuthi*	Alfken, 1900	S	H
Andrenidae	*Andrena komachi*	Hirashima, 1965	S	H
Andrenidae	*Andrena lapponica*	Zetterstedt, 1838	S	H
Andrenidae	*Andrena longitibialis*	Hirashima, 1962	S	H

Andrenidae	*Andrena mandibularis*	Robertson, 1892	S	H
Andrenidae	*Andrena melanochroa*	Cockerell, 1898	S	H
Andrenidae	*Andrena minutula*	Kirby, 1802	S	H
Andrenidae	*Andrena minutuloides*	Perkins, 1914	S	H
Andrenidae	*Andrena miranda*	Smith, 1879	S	H
Andrenidae	*Andrena miserabilis*	Cresson, 1872	S	H
Andrenidae	*Andrena mitakensis*	Hirashima, 1963	S	H
Andrenidae	*Andrena miyamotoi*	Hirashima, 1964	S	H
Andrenidae	*Andrena nasonii*	Robertson, 1895	S	H
Andrenidae	*Andrena nawai*	Cockerell, 1913	S	H
Andrenidae	*Andrena nigrihirta*	Ashmead, 1890	S	H
Andrenidae	*Andrena nitida*	Müller, 1776	S	H
Andrenidae	*Andrena nivalis*	Smith, 1853	S	H
Andrenidae	*Andrena omogensis*	Hirashima, 1953	S	H
Andrenidae	*Andrena opacifovea*	Hirashima, 1952	S	H
Andrenidae	*Andrena pandellei*	Pérez, 1895	S	H
Andrenidae	*Andrena parathoracica*	Hirashima, 1957	S	H
Andrenidae	*Andrena personata*	Robertson, 1897	S	H
Andrenidae	*Andrena prostomias*	Pérez, 1905	S	H
Andrenidae	*Andrena regularis*	Malloch, 1917	S	H
Andrenidae	*Andrena rufosignata*	Cockerell, 1902	S	H
Andrenidae	*Andrena rugosa*	Robertson, 1891	S	H
Andrenidae	*Andrena sigmundi*	Cockerell, 1902	S	H
Andrenidae	*Andrena* sp	-	S	H
Andrenidae	*Andrena stellaria*	Hirashima, 1964	S	H
Andrenidae	*Andrena sublevigata*	Hirashima, 1966	S	H
Andrenidae	*Andrena subopaca*	Nylander, 1848	S	H
Andrenidae	*Andrena thaspii*	Graenicher, 1903	S	H
Andrenidae	*Andrena togashii*	Tadauchi and Hirashima, 1984	S	H
Andrenidae	*Andrena tridens*	Robertson, 1902	S	H
Andrenidae	*Andrena tsukubana*	Hirashima, 1957	S	H
Andrenidae	*Andrena vicina*	Smith, 1853	S	H
Andrenidae	*Andrena violae*	Robertson, 1891	S	H
Andrenidae	*Andrena w-scripta*	Viereck, 1904	S	H
Andrenidae	*Andrena watasei*	Cockerell, 1913	S	H
Andrenidae	*Andrena wheeleri*	Graenicher, 1904	S	H
Andrenidae	*Andrena wilkella*	Kirby, 1802	S	H
Andrenidae	*Andrena yamato*	Tadauchi and Hirashima, 1983	S	H
Andrenidae	*Andrena ziziaeformis*	Cockerell, 1908	S	H
Tenthredinidae	*Aneugmenus carinifrons*	Malaise	S	G
Pompilidae	*Anoplius eous*	Yasumatsu, 1936	S	G
Formicidae	*Anoplolepis longipes*	Jerdon, 1851	E	F
Vespidae	*Anterhynchium flavomarginatum*	Smith	S	G
Vespidae	*Anterhynchium flavomarginatum micado*	Kirsch, 1873	S	G
Megachilidae	*Anthidium septemspinosum*	Lepeletier, 1841	S	H
Megachilidae	*Anthidium* sp	-	S	H
Megachilidae	*Anthidium striatum*	Wu, 2004	S	H
Apidae	*Anthophora plumipes*	Pallas, 1772	S	H
Apidae	*Anthophora* sp	-	S	H
Apidae	*Anthophora villosula*	Pallas, 1772	S	H
Apidae	*Apis cerana*	Fabricius, 1793	E	H
Apidae	*Apis cerana japonica*	Radoszkowski	E	H
Apidae	*Apis mellifera*	Linnaeus, 1758	E	H
Argidae	*Arge nigrinodosa*	Motschulsky, 1860	S	G
Argidae	*Arge nipponensis*	Rohwer, 1910	S	G
Argidae	*Arge pagana*	Panzer, 1797	S	G
Argidae	*Arge similis*	Vollenhoven, 1860	S	G
Argidae	*Arge* sp	-	S	G
Argidae	*Arge ustulata*	Linnaeus, 1758	S	G
Tenthredinidae	*Asiemphytus albilabris*	Takeuchi	S	G
Tenthredinidae	*Asiemphytus deutziae*	Takeuchi	S	G
Tenthredinidae	*Athalia bicolor*	Serville	S	G
Tenthredinidae	*Athalia circularis*	Klug	S	G

Tenthredinidae	*Athalia cordata*	Serville	S	G
Tenthredinidae	*Athalia japonica*	Klug	S	G
Tenthredinidae	*Athalia rosae*	Linnaeus	S	G
Halictidae	*Augochlora pura*	Say, 1837	S	D
Halictidae	*Augochlorella aurata*	Smith, 1853	P	D
Pompilidae	*Batozenellus* sp	-	S	G
Apidae	*Bombus alpinus*	Linnaeus, 1758	P	H
Apidae	*Bombus ardens*	Smith, 1879	P	H
Apidae	*Bombus barbutellus*	Kirby, 1802	P	H
Apidae	*Bombus beaticola*	Tkalcu, 1968	P	H
Apidae	*Bombus bimaculatus*	Cresson, 1863	P	H
Apidae	*Bombus bohemicus*	Seidl, 1838	P	H
Apidae	*Bombus consobrinus*	Dahlbom, 1832	P	H
Apidae	*Bombus dahlbomii*	Guérin-Méneville, 1835	P	H
Apidae	*Bombus diversus*	Smith, 1869	P	H
Apidae	*Bombus griseocollis*	De Geer, 1773	P	H
Apidae	*Bombus honshuensis*	Tkalcu, 1968	P	H
Apidae	*Bombus hortorum*	Linnaeus, 1761	P	H
Apidae	*Bombus humilis*	Illiger, 1806	P	H
Apidae	*Bombus hyperboreus*	Schönherr, 1809	P	H
Apidae	*Bombus hypnorum*	Linnaeus, 1758	P	H
Apidae	*Bombus hypocrita*	Pérez, 1905	P	H
Apidae	*Bombus ignitus*	Smith, 1869	P	H
Apidae	*Bombus impatiens*	Cresson, 1863	P	H
Apidae	*Bombus lapidarius*	Linnaeus, 1758	P	H
Apidae	*Bombus lucorum*	Linnaeus, 1761	P	H
Apidae	*Bombus muscorum*	Linnaeus, 1758	P	H
Apidae	*Bombus norvegicus*	Sparre-Schneider, 1918	P	H
Apidae	*Bombus pascuorum*	Scopoli, 1763	P	H
Apidae	*Bombus pennsylvanicus*	De Geer, 1773	P	H
Apidae	*Bombus perplexus*	Cresson, 1863	P	H
Apidae	*Bombus polaris*	Curtis, 1835	P	H
Apidae	*Bombus pratorum*	Linnaeus, 1761	P	H
Apidae	*Bombus ruderarius*	Müller, 1776	P	H
Apidae	*Bombus ruderatus*	Fabricius, 1775	P	H
Apidae	*Bombus rupestris*	Fabricius, 1793	P	H
Apidae	*Bombus sandersoni*	Franklin, 1913	P	H
Apidae	*Bombus soroeensis*	Fabricius, 1776	P	H
Apidae	*Bombus* sp	-	P	H
Apidae	*Bombus subterraneus*	Linnaeus, 1758	P	H
Apidae	*Bombus sylvarum*	Linnaeus, 1761	P	H
Apidae	*Bombus sylvestris*	Lepeletier, 1832	P	H
Apidae	*Bombus ternarius*	Say, 1837	P	H
Apidae	*Bombus terrestris*	Linnaeus, 1758	P	H
Apidae	*Bombus terrestris/lucorum*	Linnaeus, 1761	P	H
Apidae	*Bombus terricola*	Kirby, 1837	P	H
Apidae	*Bombus vagans*	Smith, 1854	P	H
Apidae	*Bombus vestalis*	Geoffroy, 1785	P	H
Apidae	*Bombus wurflenii*	Radoszkowski, 1860	P	H
Chalcididae	*Brachymeria fiskei*	Crawford	S	G
Formicidae	*Brachymyrmex* sp	-	E	F
Colletidae	*Cadeguala albopilosa*	Spinola, 1851	S	H
Halictidae	*Caenohalictus* sp	-	S	H
Formicidae	*Camponotus aethiops*	Latreille, 1798	E	F
Formicidae	*Camponotus capperi subdepilis*	Wheeler, 1917	E	F
Formicidae	*Camponotus hannani*	Forel, 1899	E	F
Formicidae	*Camponotus japonicus*	Mayr, 1866	E	F
Formicidae	*Camponotus kiusiuensis*	Santschi, 1937	E	F
Formicidae	*Camponotus nipponensis*	Santschi, 1937	E	F
Formicidae	*Camponotus obscuripes*	Mayr, 1879	E	F
Formicidae	*Camponotus* sp	-	E	F
Scoliidae	*Campsomeris annulata*	Fabricius, 1793	S	G
Scoliidae	*Campsomeris grossa*	Fabricius, 1804	S	G
Scoliidae	*Campsomeris grossa matsumurai*	Betrem, 1941	S	G
Scoliidae	*Campsomeris prismatica*	Smith, 1855	S	G

Scoliidae	*Campsomeris testaceipes*	Cameron, 1904	S	G
Scoliidae	*Carinoscolia melanosoma fascinata*	Smith, 1873	S	G
Apidae	*Centris aenea*	Lepeletier, 1841	S	H
Apidae	*Centris caxiensis*	Ducke, 1907	S	H
Apidae	*Centris flavifrons*	Fabricius, 1775	S	H
Apidae	*Centris fuscata*	Lepeletier, 1841	S	H
Apidae	*Centris obsoleta*	Lepeletier, 1841	S	H
Apidae	*Centris* sp	-	S	H
Apidae	*Centris tarsata*	Smith, 1874	S	H
Apidae	*Centris trigonoides*	Lepeletier, 1841	S	H
Cephidae	*Cephus pygmaeus*	Linnaeus	S	G
Cephidae	*Cephus spinipes*	Panzer, 1799	S	G
Apidae	*Ceratina calcarata*	Robertson, 1900	S	H
Apidae	*Ceratina cucurbitina*	Rossi, 1792	S	H
Apidae	*Ceratina cyanea*	Kirby, 1802	S	H
Apidae	*Ceratina esakii*	Yasumatsu and Hirashima, 1969	S	H
Apidae	*Ceratina flavipes*	Smith, 1879	S	H
Apidae	*Ceratina iwatai*	Yasumatsu, 1936	S	H
Apidae	*Ceratina japonica*	Cockerell, 1911	S	H
Apidae	*Ceratina megastigmata*	Yasumatsu and Hirashima, 1969	S	H
Apidae	*Ceratina okinawana*	Matsumura and Uchida, 1926	S	H
Apidae	*Ceratina satoi*	Yasumatsu, 1936	S	H
Apidae	*Ceratina* sp	-	S	H
Apidae	*Ceratina strenua*	Smith, 1879	S	H
Crabronidae	*Cerceris albofasciata*	Rossi, 1790	S	H
Crabronidae	*Cerceris carinalis*	Pérez, 1904	S	H
Crabronidae	*Cerceris hortivaga*	Kohl, 1880	S	H
Crabronidae	*Cerceris japonica*	Ashmead, 1904	S	H
Crabronidae	*Cerceris* sp	-	S	H
Crabronidae	*Cerceris yuwanensis*	Tsuneki, 1982	S	H
Apidae	*Chalepogenus caeruleus*	Friese, 1906	S	H
Braconidae	*Chelonus* sp	-	S	G
Megachilidae	*Chelostoma rapunculi*	Lepeletier, 1841	S	H
Colletidae	*Chilicola* sp	-	S	H
Chrysididae	*Chrysis fulgida*	Linnaeus, 1761	S	G
Eulophidae	*Chrysocharis* sp	-	S	G
Megachilidae	*Coelioxys brevis*	Eversmann, 1852	S	H
Megachilidae	*Coelioxys fenestratus*	Smith, 1873	S	H
Megachilidae	*Coelioxys yanonis*	Matsumura, 1912	S	H
Colletidae	*Colletes babai*	Hirashima and Tadauchi, 1979	S	H
Colletidae	*Colletes inaequalis*	Say, 1837	S	H
Colletidae	*Colletes patellatus*	Pérez, 1905	S	H
Colletidae	*Colletes perforator*	Smith, 1869	S	H
Colletidae	*Colletes seminitidus*	Spinola, 1851	S	H
Colletidae	*Colletes* sp	-	S	H
Tenthredinidae	*Corymbas nipponica*	Takeuchi	S	G
Halictidae	*Corynura prothysteres*	Vachal, 1904	S	H
Halictidae	*Corynura* sp	-	S	H
Braconidae	*Cotesia* sp	-	S	G
Crabronidae	*Crabro* sp	-	S	H
Formicidae	*Crematogaster steinheili*	Forel, 1881	E	F
Crabronidae	*Crossocerus cetratus*	Shuckard, 1837	S	H
Crabronidae	*Crossocerus* sp	-	S	H
Crabronidae	*Crossocerus walkeri*	Shuckard, 1837	S	H
Pompilidae	*Cyphononyx fulvognathus*	Rohwer, 1911	S	G
Vespidae	*Delta alluaudi*	Pérez	S	G
Eulophidae	*Diglyphus minoeus*	Walker, 1838	S	G
Tenthredinidae	*Dolerus asper*	Zaddach, 1859	S	G
Tenthredinidae	*Dolerus carbonarius*	Zaddach, 1859	S	G
Tenthredinidae	*Dolerus eversmanni obscurus*	Marlatt	S	G
Tenthredinidae	*Dolerus vestigialis insulicola*	Rohwer	S	G

Vespidae	*Dolichovespula adulterina*	du Buysson, 1904	E	G
Vespidae	*Dolichovespula arenaria*	Fabricius, 1775	E	G
Vespidae	*Dolichovespula media*	Retzius	E	G
Vespidae	*Dolichovespula norvegicoides*	Sladen, 1918	E	G
Vespidae	*Dolichovespula norwegica*	Fabricius, 1781	E	G
Vespidae	*Dolichovespula saxonica*	Fabricius, 1793	E	G
Vespidae	*Dolichovespula sylvestris*	Scopoli	E	G
Ichneumonidae	*Dusona bucculenta*	Holmgren	S	G
Ichneumonidae	*Dusona stragifex*	Förster	S	G
Crabronidae	*Ectemnius confinis*	Walker, 1871	S	H
Crabronidae	*Ectemnius continuus*	Fabricius, 1804	S	H
Crabronidae	*Ectemnius dives*	Lepeletier and Brullé, 1835	S	H
Crabronidae	*Ectemnius lapidarius*	Panzer, 1804	S	H
Crabronidae	*Ectemnius nigritarsus*	Herrich-Schaeffer, 1841	S	H
Crabronidae	*Ectemnius radiatus*	Pérez, 1905	S	H
Crabronidae	*Ectemnius rubicola*	Tuthill, 1943	S	H
Crabronidae	*Ectemnius rubicola nipponis*	Tsuneki, 1960	S	H
Crabronidae	*Ectemnius ruficornis*	Zetterstedt, 1838	S	H
Crabronidae	*Ectemnius* sp	-	S	G
Tenthredinidae	*Empria quadrimaculata*	Takeuchi	S	G
Apidae	*Epeolus melectiformis*	Yasumatsu, 1938	S	H
Apidae	*Epicharis* sp	-	S	H
Ichneumonidae	*Erromenus junior*	Thunberg	S	G
Megachilidae	*Euaspis basalis*	Ritsema, 1874	S	H
Apidae	*Eucera nigrescens*	Pérez, 1879	S	H
Apidae	*Eucera nipponensis*	Pérez, 1905	S	H
Apidae	*Eucera* sp	-	S	H
Apidae	*Euglossa jamaicensis*	Moure, 1968	S	H
Vespidae	*Eumenes micado*	Cameron	S	G
Vespidae	*Eumenes rubronotatus*	Pérez	S	G
Vespidae	*Eumenes samurayi*	Schulthess, 1908	S	G
Halictidae	*Eupetersia scotti*	Cockerell, 1912	S	H
Colletidae	*Euryglossa* sp	-	S	H
Ichneumonidae	*Exetastes fornicator*	Fabricius, 1781	S	G
Apidae	*Exoneura* sp	-	S	H
Tenthredinidae	*Fenusa* sp	-	S	G
Formicidae	*Formica cunicularia*	Latreille, 1798	E	F
Formicidae	*Formica japonica*	Motschoulsky, 1866	E	F
Formicidae	*Formica rufa*	Linnaeus, 1761	E	F
Formicidae	*Formica rufibarbis*	Fabricius, 1793	E	F
Formicidae	*Formica* sp	-	E	F
Vespidae	*Gymnomerus laevipes*	Shuckard	S	G
Apidae	*Habropoda laboriosa*	Fabricius, 1804	S	H
Halictidae	*Halictus (Protohalictus) rubicundus*	Christ, 1791	S	H
Halictidae	*Halictus (Seladonia) confusus*	Smith, 1853	S	H
Halictidae	*Halictus aerarius*	Smith, 1873	S	H
Halictidae	*Halictus gemmeus*	Dours, 1872	S	H
Halictidae	*Halictus pyrenaeus*	Pérez, 1903	S	H
Halictidae	*Halictus simplex*	Blüthgen, 1923	S	H
Halictidae	*Halictus* sp	-	S	H
Halictidae	*Halictus tumulorum*	Linnaeus, 1758	S	H
Apidae	*Hasinamelissa* sp	-	S	H
Heloridae	*Helorus ruficornis*	Förster, 1856	S	G
Pompilidae	*Hemipepsis hilaris*	Walker, 1848	S	G
Megachilidae	*Hoplitis leucomelana*	Kirby, 1802	S	H
Megachilidae	*Hoplitis producta*	Cresson, 1864	S	H
Colletidae	*Hylaeus angustatus*	Schenck, 1861	S	H
Colletidae	*Hylaeus annularis*	Kirby, 1802	S	H
Colletidae	*Hylaeus basalis*	Smith, 1953	S	H
Colletidae	*Hylaeus communis*	Nylander, 1852	S	H
Colletidae	*Hylaeus confusus*	Nylander, 1852	S	H
Colletidae	*Hylaeus ellipticus*	Linnaeus, 1758	S	H
Colletidae	*Hylaeus floralis*	Smith, 1873	S	H
Colletidae	*Hylaeus globulus*	Vachal, 1903	S	H

Colletidae	*Hylaeus gredleri*	Förster, 1871	S	H
Colletidae	*Hylaeus insularum*	Yasumatsu and Hirashima, 1965	S	H
Colletidae	*Hylaeus macilentus*	Ikudome, 1989	S	H
Colletidae	*Hylaeus nigritus*	Fabricius, 1798	S	H
Colletidae	*Hylaeus nippon*	Hirashima, 1977	S	H
Colletidae	*Hylaeus noomen*	Hirashima, 1977	S	H
Colletidae	*Hylaeus paradifformis*	Ikudome, 1989	S	H
Colletidae	*Hylaeus semipersonatus*	Cockerell, 1929	S	H
Colletidae	*Hylaeus sinuatus*	Schenck, 1853	S	H
Colletidae	*Hylaeus* sp	-	S	H
Colletidae	*Hylaeus stevensi*	Crawford, 1913	S	H
Colletidae	*Hylaeus submonticola*	Ikudome, 1989	S	H
Colletidae	*Hylaeus thoracius*	-	S	H
Colletidae	*Hylaeus variegatus*	Fabricius, 1798	S	H
Colletidae	*Hyphesma* sp	-	S	H
Ichneumonidae	*Ichneumon affector*	Tischbein	S	G
Ichneumonidae	*Ichneumon alpinator*	Aubert	S	G
Ichneumonidae	*Ichneumon terminatorius*	Gravenhorst	S	G
Sphecidae	*Isodontia nigella*	Smith, 1856	S	G
Ichneumonidae	*Lagarotis semicaligata*	Gravenhorst	S	G
Tenthredinidae	*Lagidina platycerus*	Marlatt, 1898	S	G
Crabronidae	*Larra* sp	-	S	H
Halictidae	*Lasioglossum (Ctenonomia) mahense*	Cameron, 1907	S	H
Halictidae	*Lasioglossum (Ctenonomia)* sp	-	S	C
Halictidae	*Lasioglossum (Dialictus) abanci*	Crawford, 1932	Unk	-
Halictidae	*Lasioglossum (Dialictus) atroglaucum*	Strand, 1914	Unk	-
Halictidae	*Lasioglossum (Dialictus) coeruleum*	Robertson, 1893	P	L
Halictidae	*Lasioglossum (Dialictus) cressonii*	Robertson, 1890	P	C
Halictidae	*Lasioglossum (Dialictus) imitatum*	Smith, 1853	P	C
Halictidae	*Lasioglossum (Dialictus) leucopus*	Kirby, 1802	S	C
Halictidae	*Lasioglossum (Dialictus) morio*	Fabricius, 1793	P	C
Halictidae	*Lasioglossum (Dialictus) oblongum*	Lovell, 1905	Unk	-
Halictidae	*Lasioglossum (Dialictus) obscurum*	Robertson, 1892	Unk	-
Halictidae	*Lasioglossum (Dialictus) pilosum*	Smith, 1853	P	C
Halictidae	*Lasioglossum (Dialictus) problematicum*	Blüthgen, 1923	P	A
Halictidae	*Lasioglossum (Dialictus)* sp	-	PoorID	-
Halictidae	*Lasioglossum (Dialictus) zephyrum*	Smith, 1853	P	C
Halictidae	*Lasioglossum (Dialictus/Hemihalictus) japonicum*	Dalla Torre, 1896	S	I
Halictidae	*Lasioglossum (Dialictus/Hemihalictus) macoupinense*	Robertson, 1895	S	C
Halictidae	*Lasioglossum (Dialictus/Hemihalictus) sexstrigatum*	Schenck, 1870	P	E
Halictidae	*Lasioglossum (Dialictus/Hemihalictus) taeniolellum*	Vachal, 1903	Unk	-
Halictidae	*Lasioglossum (Dialictus/Hemihalictus) transpositum*	Cockerell, 1925	S	C
Halictidae	*Lasioglossum (Evylaeus) percrassiceps*	Cockerell, 1931	Unk	-
Halictidae	*Lasioglossum (Evylaeus)* sp	-	PoorID	-
Halictidae	*Lasioglossum (Evylaeus/Sphecodogastra) apristum*	Vachal, 1903	P	C
Halictidae	*Lasioglossum (Evylaeus/Sphecodogastra) baleicum*	Cockerell, 1937	S&P	M
Halictidae	*Lasioglossum (Evylaeus/Sphecodogastra) duplex*	Dalla Torre, 1896	P	C
Halictidae	*Lasioglossum (Evylaeus/Sphecodogastra) quebecense*	Crawford, 1907	S	C
Halictidae	*Lasioglossum (Hemialictus) allodalum*	Ebmer and Sakagami, 1985	S	K
Halictidae	*Lasioglossum (Hemialictus) amamiense*	Ebmer and Sakagami, 1994	PoorID	-
Halictidae	*Lasioglossum (Hemihalictus) punctatissimum*	Schenck, 1853	Unk	-
Halictidae	*Lasioglossum (Hemihalictus) villosulum*	Kirby, 1802	S	C

Halictidae	*Lasioglossum (Homalictus) hirashimae*	Ebmer and Sakagami, 1985	Unk	-
Halictidae	*Lasioglossum (Lasioglossum) exiliceps*	Vachal, 1903	S	C
Halictidae	*Lasioglossum (Lasioglossum) forbesii*	Robertson, 1890	S	C
Halictidae	*Lasioglossum (Lasioglossum) fuscipenne*	Smith, 1853	S	C
Halictidae	*Lasioglossum (Lasioglossum) lativentre*	Schenck, 1853	S	H
Halictidae	*Lasioglossum (Lasioglossum) leviventre*	Pérez, 1905	S	H
Halictidae	*Lasioglossum (Lasioglossum) proximatum*	Smith, 1879	S	C
Halictidae	*Lasioglossum (Lasioglossum)* sp	-	S	C
Halictidae	*Lasioglossum (Lasioglossum/Leuchalictus) kansuense*	Blüthgen, 1934	S	C
Halictidae	*Lasioglossum (Lasioglossum/Leuchalictus) occidens*	Smith, 1873	S	C
Halictidae	*Lasioglossum (Leuchalictus) gorkiense*	Blüthgen, 1931	S	H
Halictidae	*Lasioglossum (Leuchalictus) harmandi*	Vachal, 1903	S	H
Halictidae	*Lasioglossum (Leuchalictus) laevigatum*	Kirby, 1802	S	H
Halictidae	*Lasioglossum (Leuchalictus) leucozonium*	Schrank, 1781	S	C
Halictidae	*Lasioglossum (Leuchalictus) mutilum*	Vachal, 1903	S	A
Halictidae	*Lasioglossum (Leuchalictus) scitulum*	Smith, 1873	S	A
Halictidae	*Lasioglossum (Leuchalictus) subopacum*	Smith, 1853	S	H
Halictidae	*Lasioglossum (Parasphecodes)* sp	-	C	C
Halictidae	*Lasioglossum (Sphecodogastra) affine*	Smith, 1853	P	K
Halictidae	*Lasioglossum (Sphecodogastra) albipes*	Fabricius, 1781	S&P	C
Halictidae	*Lasioglossum (Sphecodogastra) calceatum*	Scopoli, 1763	S&P	C
Halictidae	*Lasioglossum (Sphecodogastra) fulvicorne*	Kirby, 1802	S	C
Halictidae	*Lasioglossum (Sphecodogastra) laticeps*	Schenck, 1870	P	C
Halictidae	*Lasioglossum (Sphecodogastra) malachurum*	Kirby, 1802	P	C
Halictidae	*Lasioglossum (Sphecodogastra) minutulum*	Schenck, 1853	Unk	-
Halictidae	*Lasioglossum (Sphecodogastra) nipponense*	Hirashima, 1953	Unk	-
Halictidae	*Lasioglossum (Sphecodogastra) pauxillum*	Schenck, 1853	P	C
Halictidae	*Lasioglossum (Sphecodogastra) sibiriacum*	Blüthgen, 1923	Unk	-
Halictidae	*Lasioglossum* sp	-	PoorID	-
Formicidae	*Lasius fuliginosus*	Latreille, 1798	E	F
Formicidae	*Lasius hayashi*	Yamauchi and Hayashida, 1970	E	F
Formicidae	*Lasius niger*	Linnaeus, 1758	E	F
Formicidae	*Lasius* sp	-	E	F
Colletidae	*Leioproctus* sp	-	S	H
Crabronidae	*Lestica (Clypeocrabro) clypeata*	Schreber, 1759	S	H
Crabronidae	*Lestica collaris*	Matsumura, 1912	S	H
Crabronidae	*Lindenius albilabris*	Fabricius, 1793	S	H
Ichneumonidae	*Liotryphon punctulata*	Ratzeburg, 1848	S	G
Megachilidae	*Lithurgus collaris*	Smith, 1873	S	H
Tenthredinidae	*Macrophya apicalis*	Smith	S	G
Tenthredinidae	*Macrophya falsifica*	Mocsáry	S	G
Tenthredinidae	*Macrophya rufipes*	Linnaeus	S	G
Tenthredinidae	*Macrophya* sp	-	S	G
Apidae	*Manuelia gayi*	Spinola, 1851	S	H
Apidae	*Manuelia postica*	Spinola, 1851	S	H
Megachilidae	*Megachile alpicola*	Alfken, 1924	S	H
Megachilidae	*Megachile disjunctiformis*	Cockerell, 1911	S	H
Megachilidae	*Megachile kobensis*	Cockerell, 1918	S	H
Megachilidae	*Megachile nigriventris*	Schenck, 1870	S	H
Megachilidae	*Megachile nipponica*	Cockerell, 1914	S	H
Megachilidae	*Megachile nipponica amamiensis*	Hirashima, 1958	S	H
Megachilidae	*Megachile okinawana*	Yasumatsu and Hirashima, 1964	S	H
Megachilidae	*Megachile pseudomonticola*	Hedicke, 1925	S	H
Megachilidae	*Megachile remota sakagamii*	Smith, 1879	S	H
Megachilidae	*Megachile sakagamii*	Hirashima and Maeta, 1974	S	H
Megachilidae	*Megachile sculpturalis*	Smith, 1853	S	H
Megachilidae	*Megachile seychellensis*	Cameron, 1907	S	H

Megachilidae	Megachile sp	-	S	H
Megachilidae	*Megachile subalbuta*	Yasumatsu, 1936	S	H
Megachilidae	*Megachile sumizome*	Hirashima and Maeta, 1974	S	H
Megachilidae	*Megachile tsurugensis*	Cockerell, 1924	S	H
Megachilidae	*Megachile willughbiella*	Kirby, 1802	S	H
Megachilidae	*Megachile yasumatsui*	Hirashima, 1974	S	H
Apidae	*Melecta luctuosa*	Scopoli, 1770	S	H
Melittidae	*Melitta haemorrhoidalis*	Fabricius, 1775	S	H
Melittidae	*Melitta leporina*	Panzer, 1799	S	H
Formicidae	*Myrmica rubra*	Linnaeus, 1758	E	F
Apidae	*Nomada amurensis*	Radoszkowski, 1876	S	H
Apidae	*Nomada aswensis*	Tsuneki, 1973	S	H
Apidae	*Nomada bishoppii*	Cockerell, 1911	S	H
Apidae	*Nomada clalii okubira*	Tsuneki, 1973	S	H
Apidae	*Nomada comparata*	Cockerell, 1911	S	H
Apidae	*Nomada cuneata*	Robertson, 1903	S	H
Apidae	*Nomada flavoguttata*	Kirby, 1802	S	H
Apidae	*Nomada fukuiana*	Tsuneki, 1973	S	H
Apidae	*Nomada galloisi*	Yasumatsu and Hirashima, 1953	S	H
Apidae	*Nomada ginran*	Tsuneki, 1973	S	H
Apidae	*Nomada hakonensis*	Cockerell, 1911	S	H
Apidae	*Nomada harimensis*	Cockerell, 1914	S	H
Apidae	*Nomada issikii*	Yasumatsu, 1939	S	H
Apidae	*Nomada japonica*	Smith, 1873	S	H
Apidae	*Nomada luteola*	Olivier, 1812	S	H
Apidae	*Nomada marshamella*	Kirby, 1802	S	H
Apidae	*Nomada nipponica*	Yasumatsu and Hirashima, 1951	S	H
Apidae	*Nomada okubira*	Tsuneki, 1973	S	H
Apidae	*Nomada pacifica*	Tsuneki, 1973	S	H
Apidae	*Nomada perplexa*	Cresson, 1863	S	H
Apidae	*Nomada pygmaea*	Cresson, 1863	S	H
Apidae	*Nomada sayi*	Robertson, 1893	S	H
Apidae	*Nomada shepparadana okubira*	Tsuneki	S	H
Apidae	*Nomada shirakii*	Yasumatsu and Hirashima, 1951	S	H
Apidae	*Nomada* sp	-	S	H
Halictidae	*Nomia pavonura*	Cockerell, 1912	S	H
Formicidae	*Ochetellus itoi*	Forel, 1900	E	F
Braconidae	*Odontobracon* sp	-	S	G
Vespidae	*Okinawepipona kogimai nagasei*	Yamane, 1987	S	G
Pamphiliidae	*Onycholyda lucida*	Rohwer, 1910	S	G
Vespidae	*Orancistrocerus drewseni*	de Saussure, 1857	S	G
Vespidae	*Oreumenes decoratus*	Smith, 1852	S	G
Cimbicidae	*Orientabia maguna*	Takeuchi	S	G
Megachilidae	*Osmia atriventris*	Cresson, 1864	S	H
Megachilidae	*Osmia aurulenta*	Panzer, 1799	S	H
Megachilidae	*Osmia bicornis*	Linnaeus, 1758	S	H
Megachilidae	*Osmia conjuncta*	Cresson, 1864	S	H
Megachilidae	*Osmia cornifrons*	Radoszkowski, 1887	S	H
Megachilidae	*Osmia jacoti*	Cockerell, 1929	S	H
Megachilidae	*Osmia lignaria*	Say, 1837	S	H
Megachilidae	*Osmia orientalis*	Benoist, 1929	S	H
Megachilidae	*Osmia proxima*	Cresson, 1864	S	H
Megachilidae	*Osmia pumila*	Cresson, 1864	S	H
Megachilidae	*Osmia simillima*	Smith, 1853	S	H
Megachilidae	*Osmia* sp	-	S	H
Megachilidae	*Osmia taurus*	Smith, 1873	S	H
Megachilidae	*Osmia truncorum*	Linnaeus, 1758	S	H
Tenthredinidae	*Pachyprotasis hiensis*	Inomata	S	G
Tenthredinidae	*Pachyprotasis* sp	-	S	G
Tenthredinidae	*Pachyprotasis tanakai*	Gilbert and Burke, 1912	S	G
Andrenidae	*Panurginus crawfordi*	Cockerell, 1914	C	H

Andrenidae	*Panurginus* sp	-	C	H
Vespidae	*Parapolybia indica*	de Saussure	E	G
Vespidae	*Parapolybia varia*	Fabricius	E	G
Formicidae	*Paratrechina flavipes*	Smith, 1874	E	F
Crabronidae	*Passaloecus clypealis yamato*	Tsuneki, 1955	S	H
Crabronidae	*Passaloecus* sp	-	S	H
Tenthredinidae	*Perineura okutanii*	Takeuchi	S	G
Formicidae	*Pheidole megacephala*	Fabricius, 1793	E	F
Ichneumonidae	*Phygadeuon* sp	-	S	G
Ichneumonidae	*Pimpla melanacrias*	Perkins	S	G
Formicidae	*Plagiolepis pygmaea*	Latreille, 1798	E	F
Platygastridae	*Platygaster* sp	-	S	G
Vespidae	*Polistes bischoffi*	Weyrauch	E	G
Vespidae	*Polistes chinensis antennalis*	Fabricius, 1793	E	G
Vespidae	*Polistes dominulus*	Christ, 1791	E	G
Vespidae	*Polistes gallicus*	Linnaeus, 1767	E	G
Vespidae	*Polistes hebraeus*	Fabricius, 1787	E	G
Vespidae	*Polistes jadwigae*	Cameron, 1900	E	G
Vespidae	*Polistes japonicus*	de Saussure, 1858	E	G
Vespidae	*Polistes mandarinus*	de Saussure, 1853	E	G
Vespidae	*Polistes nimpha*	Christ, 1791	E	G
Vespidae	*Polistes olivaceus*	Degeer, 1773	E	G
Vespidae	*Polistes rothneyi iwatai*	van der Vecht, 1968	E	G
Vespidae	*Polistes snelleni*	de Saussure, 1862	E	G
Vespidae	*Polistes* sp	-	E	G
Ichneumonidae	*Porizontini sp*	-	S	G
Tenthredinidae	*Priophorus nigricans*	Cameron	S	G
Formicidae	*Pristomyrmex pungens*	Mayr, 1866	E	F
Andrenidae	*Protandrena* sp	-	C	H
Crabronidae	*Psen* sp	-	S	H
Crabronidae	*Psenulus* sp	-	S	H
Megachilidae	*Rhodanthidium sticticum*	Fabricius, 1787	S	H
Tenthredinidae	*Rhogogaster varipes*	Coquillett, 1904	S	G
Crabronidae	*Rhopalum latronum*	Kohl, 1915	S	H
Crabronidae	*Rhopalum* sp	-	S	H
Vespidae	*Rhynchalastor chinensis simillimus*	Yamane and Gusenleitner, 1982	S	G
Vespidae	*Rhynchalastor frauenfeldi*	de Saussure, 1867	S	G
Vespidae	*Rhynchalastor kusigematii tsunekii*	Tano, 1987	S	G
Halictidae	*Ruizantheda mutabilis*	Spinola, 1851	S	H
Halictidae	*Ruizantheda nigrocaerulea*	Spinola	S	H
Halictidae	*Ruizantheda proxima*	Spinola, 1851	S	H
Ichneumonidae	*Scambus brevicornis*	Gravenhorst, 1829	S	G
Ichneumonidae	*Scambus buolianae*	Hartig, 1838	S	G
Scoliidae	*Scolia historionica japonica*	Smith, 1873	S	G
Scoliidae	*Scolia kuroiwai*	Matsumura and Uchida, 1926	S	G
Scoliidae	*Scolia oculata*	Matsumura, 1911	S	G
Scoliidae	*Scolia* sp	-	S	G
Tenthredinidae	*Selandria serva*	Fabricius	S	G
Tenthredinidae	*Siobla felox*	Smith	S	G
Halictidae	*Sphecodes ephippius*	Linnaeus, 1767	S	H
Halictidae	*Sphecodes* sp	-	S	H
Pompilidae	*Sphex diabolicus flammitrichus*	Smith, 1858	S	G
Sphecidae	*Sphex jamaicensis*	Drury, 1770	S	G
Sphecidae	*Sphex maidli*	Yasumatsu, 1938	S	G
Vespidae	*Stenodynerus* sp	-	S	G
Vespidae	*Stenodynerus tokyanus*	Kostylev	S	G
Ichneumonidae	*Stenomacrus* sp	-	S	G
Crabronidae	*Stigmus* sp	-	S	H
Tenthredinidae	*Strombocerina koebelei*	Riley, 1893	S	G
Tenthredinidae	*Strongylogaster multifasciata*	Geoffroy	S	G
Tenthredinidae	*Strongylogaster onocleae*	Takeuchi	S	G
Tenthredinidae	*Strongylogaster* sp	-	S	G
Ichneumonidae	*Sussaba erigator*	Fabricius	S	G

Apidae	*Svastrides melanura*	Spinola, 1851	S	H
Vespidae	*Symmorphus cliens*	Giordani Soika	S	G
Crabronidae	*Tachysphex japonicus*	Iwata, 1933	S	H
Crabronidae	*Tachytes* sp	-	S	H
Tenthredinidae	*Taxonus fluvicornis*	Matsumura	S	G
Tenthredinidae	*Taxonus* sp	-	S	G
Formicidae	*Technomyrmex albipes*	Smith, 1861	E	F
Tenthredinidae	*Tenthredo amoena*	Gravenhorst	S	G
Tenthredinidae	*Tenthredo arcuata*	Förster	S	G
Tenthredinidae	*Tenthredo atra*	Linnaeus	S	G
Tenthredinidae	*Tenthredo basizonata*	Malaise	S	G
Tenthredinidae	*Tenthredo brevicornis*	Fitch, 1856	S	G
Tenthredinidae	*Tenthredo convergenata*	Takeuchi	S	G
Tenthredinidae	*Tenthredo finchi seguro*	Takeuchi	S	G
Tenthredinidae	*Tenthredo flavipectus*	Matsumura	S	G
Tenthredinidae	*Tenthredo fukaii*	Rohwer	S	G
Tenthredinidae	*Tenthredo hokkaidonis*	Malaise	S	G
Tenthredinidae	*Tenthredo japonica*	Mocsáry	S	G
Tenthredinidae	*Tenthredo notha*	Klug	S	G
Tenthredinidae	*Tenthredo* sp	-	S	G
Tenthredinidae	*Tenthredo zona*	Klug	S	G
Tenthredinidae	*Tenthredo zonula*	Klug	S	G
Tenthredinidae	*Tenthredopsis ornata*	Serville	S	G
Tenthredinidae	*Tenthredopsis* sp	-	S	G
Apidae	*Tetralonia mitsukurii*	Cockerell, 1911	S	H
Apidae	*Tetralonia okinawae okinawae*	Friese, 1909	S	H
Formicidae	*Tetramorium bicarinatum*	Nylander, 1846	E	F
Tenthredinidae	*Thrinax japonica*	Rohwer	S	G
Tiphiidae	*Tiphia femorata*	Fabricius, 1775	S	G
Tiphiidae	*Tiphia* sp	-	S	G
Megachilidae	*Trachusa byssina*	Panzer, 1798	S	H
Ichneumonidae	*Tryphon ephippium*	Holmgren, 1855	S	G
Sphecidae	*Trypoxylon* sp	-	S	G
Vespidae	*Vespa analis eisa*	Yamane, 1987	E	G
Vespidae	*Vespa analis insularis*	Dalla Torre, 1894	E	G
Vespidae	*Vespa simillima*	Smith, 1868	E	G
Vespidae	*Vespa simillima xanthoptera*	Cameron, 1903	E	G
Vespidae	*Vespa tropica*	Linnaeus	E	G
Vespidae	*Vespa xanthoptera*	Cameron, 1903	E	G
Vespidae	*Vespula austriaca*	Panzer, 1799	E	G
Vespidae	*Vespula flaviceps*	Thomas, 1903	E	G
Vespidae	*Vespula flaviceps lewisi*	Cameron, 1903	E	G
Vespidae	*Vespula germanica*	Fabricius, 1793	E	G
Vespidae	*Vespula rufa*	Linnaeus, 1758	E	G
Vespidae	*Vespula schrenckii*	Linnaeus, 1758	E	G
Vespidae	*Vespula shidai*	Ishikawa, Yamane and Wagner	E	G
Vespidae	*Vespula shidai amamiana*	Yamane, 1987	E	G
Vespidae	*Vespula vulgaris*	Linnaeus, 1758	E	G
Formicidae	*Wasmannia auropunctata*	Roger, 1863	E	F
Pteromalidae	*Xestomnaster sp*	-	S	G
Apidae	*Xylocopa amamensis*	Sonan, 1934	C	H
Apidae	*Xylocopa appendiculata*	Smith, 1852	C	H
Apidae	*Xylocopa appendiculata circumvolans*	Smith, 1873	C	H
Apidae	*Xylocopa fenestrata*	Fabricius, 1798	C	H
Apidae	*Xylocopa grisescens*	Lepeletier, 1841	C	B
Apidae	*Xylocopa* sp	-	C	H
Apidae	*Xylocopa virginica*	Linnaeus, 1771	S&P	J

Species-level and network-level metrics

The three species-level metrics degree, closeness and betweenness centrality do not take into account the frequency of interactions between species (binary metrics). The remaining four species-level metrics strength, among-module connectivity, standardised within-module strength and weighted centrality are weighted. For network-level metrics, we have used the binary versions of closeness and betweenness centralisation and the weighted versions of nestedness and modularity.

Degree

The degree of pollinator species *i* is the number of interaction partners of that species that ranges from 1 to the number of species on the other set (plant species).

Closeness centrality

Species with high closeness centrality have short distances connecting in number of interactions them to other species in the network (Martín González et al. 2010). Closeness centrality of pollinator species *i* is:

$$cc_i = \sum_{j=1, i \neq j}^{S} \frac{g_{ij}}{S-1} \qquad \text{(A1)}$$

where *S* is the number of species in the network, and g_{ij} is the shortest path between species *i* and *j* measured in number of interactions (Freeman 1979, de Nooy et al. 2005).

Betweenness centrality

Species with high betweenness centrality are frequently in-between network's shortest distances (Martín González et al. 2010). The betweenness centrality of pollinator species *i* is:

$$bc_i = 2 \sum_{j<k, i \neq j} \frac{g_{jk}(i)/g_{jk}}{(S-1)(S-2)} \qquad \text{(A2)}$$

where *S* is number of species in the network, g_{jk} is the number of shortest paths linking any two species, and g_{jk}(i) is the number of shortest paths among g_{jk} passing through species *i* (Freeman 1979, de Nooy et al. 2005).

Strength

Strength is the sum of the dependences every plant species has on a focal pollinator species (Bascompte et al. 2006). The dependence of plant species *j* on pollinator species *i* is:

$$d_{ji}^{P} = \frac{I_{ij}}{\sum_{i=1}^{NA} I_{ij}} \qquad \text{(A3)}$$

where I_{ij} is the number of interactions between plant species *j* and pollinator species *i*, and *NA* is the number of pollinator species in the network. Strength of pollinator species *i* is:

$$strength_i^A = \sum_{j=1}^{NP} d_{ji}^P \quad \text{(A4)}$$

where *NP* is the number of plant species in the network, d_{ij}^P is the dependence of plant species *j* on animal species *i*.

Among-module connectivity

Among-module connectivity describes how important species are in connecting distinct modules (Olesen et al. 2007). Among-module connectivity of pollinator species *i* is:

$$c_i = 1 - \sum_{t=1}^{N_M} \left(\frac{st_{it}}{st_i}\right)^2 \quad \text{(A5)}$$

where N_M is the number of modules in the network, st_i is the strength of species *i*, and st_{it} is the strength of *i* to species in module *t*.

Standardised within-module strength

The standardised within-module degree describes how important species are in connecting species in their own module (Olesen et al. 2007). Standardised within-module degree of pollinator species *i* is:

$$z_i = \frac{st_{it} - st_t}{SD_{stt}} \quad \text{(A6)}$$

where st_{it} is the strength of *i* to other species in its own module *t*, $\overline{st}_t$ and SD_{stt} are the average and standard deviation of the within-module degree of all species in *t*.

Weighted centrality

The weighted centrality of a network is based on the Katz centrality (Katz 1953), an index for binary networks in which the higher the centrality is, the higher is the number of direct and indirect pathways connecting a species to other species in the network (Katz 1953). Because our matrix of dependences, **D**, can be described as a row stochastic matrix in which all rows sum to one, the generalisation of Katz centrality for a weighted index is trivial. The weighted centrality of a species is:

$$W_i = \sum_{t=1}^{\infty} \sum_{j=1}^{N} \mu^t d_{ji}^t \quad \text{(A7)}$$

in which *N* is the species richness, d_{ji}^t is an element of the matrix $\mathbf{D}^t$, and μ is an attenuation factor, $0 < \mu < 1$. The element d_{ji}^t matrix $\mathbf{D}^t$describes the sums of all pathways of species *i* on a given species *j*. For example, if $t = 2$, d_{ji}^2 describes the sum of all connecting pathways starting at species j on species i, $d_{ji}^2 = \sum_{k=1}^{\infty} d_{jk}\, d_{ki}$. The attenuation factor reproduces the fact that cascading effects across pathways always die off with the length of the pathway, allowing the sum of pathways to converge, in our case, if $\mu < 1$. As a consequence, it is possible to compute a row vector with weighted centrality of all species in the network, $\overrightarrow{\mathbf{W}}$:

$$\overrightarrow{\mathbf{W}} = \mathbf{1}[(I - \mu\mathbf{D})^{-1} - I] \qquad \text{(A8)}$$

where $\mathbf{1}$ is a row 1 x N vector in which all elements are one, $(I - \mu\mathbf{D})^{-1}$ is the inverse of the matrix $(I - \mu\mathbf{D})$. The higher μ, the higher is the contribution of longer pathways. Small values of μ imply that direct interactions are the main contributors to the index. Because we already explored the direct weighted effects using the strength of a species, we used a very high value of μ, $\mu = 0.95$, guaranteeing that long pathways also contribute to the species weighted centrality.

Weighted nestedness

Nestedness is a common pattern in pollination networks (Bascompte et al. 2003), in which species interact with a subset of the species with which highly connected species interact (Almeida-Neto et al. 2008). Here, we use wNODF, a nestedness metric that can be used on weighted matrices (Almeida-Neto and Ulrich 2011). The weighted paired nestedness for a pair of columns c_i and c_j (j > i) is the percentage of cells in c_j that have lower values than cells in the same row position in ci. The mean nestedness value for all column pairs is:

$$wNODF_c = 100 \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} \frac{k_{ij}}{N_j} \qquad \text{(A9)}$$

where n is the number of columns, m the number of rows, k_{ij} is the number of cells with lower values in c_j and N_j is the total number of non-zero cells in c_j. Similarly, for a pair of rows r_i and r_j (j > i) the weighted paired nestedness is the percentage of cells in r_j that have lower values than cells in the same column position in r_i. Finally, wNODF is the mean paired nestedness for the n(n - 1)/2 column pairs and the m(m – 1) / 2 row pairs:

$$wNODF = \frac{2(wNODF_c + wNODF_r)}{n(n-1) + m(m-1)} \qquad \text{(A10)}$$

Closeness and betweenness centralisation

Highly connected species may promote centralisation in networks, so that network organisation and dynamics strongly depend on a few species. We used two indexes of network centralisation based on the shortest distance in number of links between pairs of species. Networks have high closeness centralisation if there is a large variation in the length of shortest distances connecting species pairs in the network, so that few species are much closer to the rest of the network than all other species (de Nooy et al. 2005):

$$CC = \frac{\sum_{i=1}^{S}(max_{cc} - cc_i)}{(S-1)} \quad \text{(A11)}$$

where S is the number of species in the network, max_{cc} is the highest value of closeness centrality (*cc*) in the network and cc_i is the value of closeness centrality (*cc*) of species i. Networks have high betweenness centralisation if there is a large variation in how frequently species are in-between the shortest distances connecting species pairs, so that only few species are constantly in-between other species' shortest distances (de Nooy et al. 2005):

$$BC = \frac{\sum_{i=1}^{S}(max_{bc} - bc_i)}{(S-1)} \quad \text{(A12)}$$

where S is the number of species in the network, max_{bc} is the highest value of betweenness centrality (*bc*) in the network and bc_i is the value of betweenness centrality (*bc*) of species *i*.

Wighted modularity

Modularity measures the presence of species sets that interact more among themselves than with species in other sets (Olesen et al. 2007). Using the DIRTLPAwb+ algorithm (Beckett 2016), we calculated a bipartite version of Newman's modularity in our weighted networks (Barber 2007):

$$Q = \frac{1}{2N}\sum_{ij}(A_{ij} - K_{ij})\,\delta\,(m_i, m_j) \quad \text{(A13)}$$

where N is the number of network interactions, A_{ij} is the normalised number of interactions between pollinator species i and plant species j, K_{ij} is the expected probability of interactions within a module, m_i and m_j are the modules to which species i and j are assigned, and δ (m_i,m_j) is 1 when i and j are in the same module, and 0 when i and j are in different modules.

Table A3. Spearman correlation coefficients for the species-level metrics degree (k), closeness (cc) and betweenness centrality (bc), strength (st), among-module connectivity (c), standardised within-module strength (z), and weighted centrality (kc).

	k	**cc**	**bc**	**st**	**c**	**z**	**kc**
k	-	0.27	0.96	0.63	0.92	0.38	0.68
cc	-	-	0.33	0.25	0.23	-0.09	0.07
bc	-	-	-	0.60	0.91	0.33	0.65
st	-	-	-	-	0.55	0.39	0.74
c	-	-	-	-	-	0.26	0.63
z	-	-	-	-	-	-	0.50

Table A4. Correlation between all principal components (PC1 to PC7) and the species-level metrics degree (k), closeness (cc) and betweenness centrality (bc), strength (st), among-module connectivity (c), standardised within-module strength (z), and weighted centrality (kc).

	k	**cc**	**bc**	**st**	**c**	**z**	**kc**
PC1	0.91	0.33	0.65	0.83	0.76	0.68	0.89
PC2	-0.11	0.87	0.56	-0.10	-0.07	-0.28	-0.25
PC3	0.25	-0.07	-0.11	-0.16	0.60	-0.56	-0.08
PC4	-0.10	0.23	-0.37	0.45	-0.10	-0.26	0.15
PC5	0.11	0.27	-0.33	-0.16	0.13	0.28	-0.14
PC6	0.14	-0.07	0.03	0.20	-0.03	0.02	-0.32
PC7	0.25	0.02	-0.03	-0.09	-0.19	-0.08	0.07

Table A5. Weighted nestedness (wNODF), closeness (CC) and betweenness centralisation (BC) and weighted modularity (Q) of the 29 networks. Metric significance ($p < 0.05$) relative to 1000 (100 for wNODF and Q for N8, N14, N17, N29) null networks is depicted by *. Network codes can be found in table A1.

Code	wNODF	CC	BC	Q
N1	13.5*	0.081	0.178	0.567*
N2	14.88*	0.019*	0.137*	0.43*
N3	57.17*	0.002	0.09	0.223
N4	34.18*	0.045	0.266	0.470*
N5	4.9*	0.04	0.175	0.51
N6	16.2*	0.017	0.236*	0.479
N7	10.27*	0.023*	0.363*	0.629*
N8	3.25*	0.010*	0.08*	0.502
N9	7.92*	0.016	0.154*	0.615*
N10	4.02*	0.018	0.155*	0.563*
N11	17.24*	0.029	0.139	0.44
N12	8.86*	0.017	0.208	0.564
N13	19.38*	0.054	0.341	0.496
N14	3.77*	0.009*	0.108	0.586*
N15	3.03*	0.013	0.086	0.618*
N16	3*	0.010	0.073	0.566
N17	1.94*	0.010*	0.108	0.616
N18	3.84*	0.015*	0.135	0.577
N19	27.03*	0.026	0.166*	0.304*
N20	17.29*	0.058	0.276	0.441
N21	32.33*	0.051*	0.153*	0.382*
N22	26.84*	0.016	0.161	0.259
N23	23.27*	0.038	0.603*	0.497*
N24	22.74*	0.092	0.193	0.413*
N25	8.29*	0.056*	0.297	0.592
N26	37.9*	0.128*	0.589*	0.32
N27	15.38*	0.043*	0.745*	0.516*
N28	21.41*	0.066	0.526*	0.526*
N29	18.78*	0.012*	0.087*	0.477*

Table A6. Models for the effect of sociality on species interaction patterns (PC1 and PC2), including ant species as pollinators. In the first round of analysis, the four competing models had as fixed effects: no explanatory variable (model 1), sociality (model 2), sociality and interaction frequency (model 3) and interaction frequency (model 4). In models 2 and 3, sociality was divided into two levels (2LSoc): solitary versus social (C, P and E combined) species. In the second round of analysis, the selected models (model 3 for PC1 and model 2 for PC2) competed with one additional model each (model 3.b for PC1 and model 2.b for PC2) with a similar structure of the selected models but with sociality split into four levels (4LSoc): S versus C versus P versus E. S = solitary, C = communal, P = primitively eusocial, E = highly eusocial. Selected models (ΔAIC < 2) are shaded. AIC = Akaike's information criterion and ΔAIC = AIC of each model – AIC best model.

First round of analysis					
Competing models	Fixed effects	PC1		PC2	
		AIC	ΔAIC	AIC	ΔAIC
Model 1	_____	4403.7	188.5	2231.8	33.6
Model 2	2LSoc.	4334.6	119.4	2198.2	0.0
Model 3	2LSoc. × IntFreq.	4215.2	0.0	2231.6	33.4
Model 4	IntFreq.	4355.1	139.9	2249.2	51.0
Second round of analysis – PC1					
Model 3	2LSoc. × IntFreq.	4215.2	0.0		
Model 3.b	4LSoc. × IntFreq.	4227.5	12.3		
Second round of analysis – PC2					
Model 2	2LSoc.			2198.2	4.8
Model 2.b	4LSoc.			2193.4	0.0

Table A7. Analysis for the effect of sociality on species interaction patterns (PC1) performed for each network individually. The four competing models had as fixed effects: no explanatory variable (model 1), sociality (model 2), sociality and interaction frequency (model 3) and interaction frequency (model 4). In models 2 and 3, sociality was divided into two levels (2LSoc): solitary versus social (communal, primitively eusocial and highly eusocial species combined) species. Network code (Code), number of solitary (Sol.) and social species (Soc.), AIC and ΔAIC values for models 1 to 4. Selected models (ΔAIC < 2) are shaded. For all networks that had model 3 selected, the effect of sociality on PC1 was positive. Analysis including ant species as pollinators was also performed for networks in which ant species were present and are marked with (A). AIC = Akaike's information criterion and ΔAIC = AIC of each model – AIC best model.

			Model 1 (no fixed effect)		Model 2 (2LSoc)		Model 3 (2LSoc*Intfreq)		Model 4 (Intfreq)	
Code	Sol.	Soc.	AIC	ΔAIC	AIC	ΔAIC	AIC	ΔAIC	AIC	ΔAIC
N1	28	8	150.25	65.31	143.26	58.32	84.94	0	99.66	14.72
N2	23	4	126.5	28.75	126.8	29.06	101.65	3.91	97.74	0
N2 (A)	-	6	133.92	30.64	134.99	31.71	107.22	3.93	103.28	0
N3	10	3	66.75	10.87	65.63	9.76	55.88	0	56.89	1.01
N4	6	6	61.12	6.83	61.11	6.81	54.3	0	54.78	0.48
N5	21	2	82.66	40.43	75	32.76	42.23	0	47.57	5.34
N6	0	2	-	-	-	-	-	-	-	-
N6 (A)	-	3	-	-	-	-	-	-	-	-
N7	4	4	36.94	8.26	38.77	10.09	28.79	0.11	28.68	0
N7 (A)	-	8	55.46	7.58	57.2	9.32	51.77	3.89	47.88	0
N8	104	21	577.16	114.06	573.8	110.7	463.1	0	481.25	18.15
N8 (A)	-	30	612.36	119.25	611.07	117.97	493.1	0	511.13	18.03

N9	18	6	109.87	27.44	111.82	29.39	82.43	0	84.21	1.78
N10	16	20	163.19	41.66	165.15	43.62	121.53	0	128.75	7.22
N10 (A)	-	24	187.38	50.33	188.72	51.67	137.05	0	143.09	6.04
N11	1	2	-	-	-	-	-	-	-	-
N11 (A)	-	4	26.85	5.57	25.94	4.65	21.29	0	21.35	0.06
N12	1	2	-	-	-	-	-	-	-	-
N12 (A)	-	5	32.7	9.86	32.13	9.29	22.84	0	22.98	0.14
N13	6	2	43.91	18.8	45	19.88	25.12	0	35.59	10.48
N14	74	16	384.24	75.01	374.11	64.88	309.23	0	310.6	1.37
N14 (A)	-	20	401.71	79.33	388.51	66.13	322.38	0	327.53	5.15
N15	156	14	701.36	229.22	651.75	179.61	472.14	0	496.96	24.82
N15 (A)	-	21	729.53	226.81	691.34	188.62	502.72	0	526.46	23.74
N16	26	15	201.04	59.93	183.61	42.5	141.11	0	155.35	14.24
N17	32	7	178.89	46.23	180.22	47.55	136.04	3.38	132.66	0
N17 (A)	-	13	203.32	51.7	205.28	53.67	155.32	3.71	151.62	0
N18	35	10	187.33	50.32	188.81	51.8	137.01	0	137.06	0.05
N19	0	6	-	-	-	-	-	-	-	-
N20	0	1	-	-	-	-	-	-	-	-
N21	28	5	147.35	12.11	148.43	13.19	135.49	0.25	135.24	0
N22	1	2	-	-	-	-	-	-	-	-
N23	1	2	-	-	-	-	-	-	-	-
N23 (A)	-	3	26.66	16.48	17.01	6.83	11.5	1.32	10.18	0

N24	4	1	28.39	27.16	30.17	28.94	1.23	0	21.44	20.21
N25	3	8	46.62	8.95	47.88	10.21	39.86	2.19	37.67	0
N25 (A)	-	9	49.9	10.21	51.35	11.66	41.79	2.1	39.69	0
N26	16	5	101.94	18.7	102.5	19.27	85.12	1.88	83.24	0
N27	8	7	51.88	13.3	52.94	14.36	38.58	0	40.18	1.6
N28	18	4	108.66	17.58	105.88	14.8	91.08	0	93.27	2.19
N28 (A)	-	5	112.64	18.05	111.44	16.85	94.59	0	96.33	1.74
N29	81	29	484.05	105.02	460.62	81.59	379.03	0	428.27	49.24
N29 (A)	-	33	501.25	101.62	480.28	80.66	399.63	0	445.92	46.3

Table A8. Analysis for the effect of sociality on species interaction patterns (PC2) performed for each network individually. The four competing models had as fixed effects: no explanatory variable (model 1), sociality (model 2), sociality and interaction frequency (model 3) and interaction frequency (model 4). In models 2 and 3, sociality was divided into two levels (2LSoc): solitary versus social (communal, primitively eusocial and highly eusocial species combined) species. Network code (Code), number of solitary (Sol.) and social species (Soc.), AIC and ΔAIC values for models 1 to 4. Selected models (ΔAIC < 2) are shaded. Selected model in which sociality had a negative effect on PC2 are marked in bold. Analysis including ant species as pollinators was also performed for networks in which ant species were present and are marked with (A). AIC = Akaike's information criterion and ΔAIC = AIC of each model – AIC best model.

			Model 1 (no fixed effect)		Model 2 (2LSoc)		Model 3 (2LSoc*Intfreq)		Model 4 (Intfreq)	
Code	Sol.	Soc.	AIC	ΔAIC	AIC	ΔAIC	AIC	ΔAIC	AIC	ΔAIC
N1	28	8	28.2	0	29.66	1.47	31.22	3.02	29.8	1.6
N2	23	4	48.89	6.93	50.85	8.89	45.01	3.05	41.96	0
N2 (A)	-	6	50.51	7.63	52.5	9.62	45.93	3.05	42.88	0
N3	10	3	46.43	0.17	48.4	2.13	47.41	1.14	46.27	0
N4	6	6	7.98	0	9.98	2	12.46	4.47	8.92	0.94
N5	21	2	19.35	31.77	16.86	29.28	**-12.42**	**0**	14.2	26.62
N6	0	2	-	-	-	-	-	-	-	-
N6 (A)	-	3	-	-	-	-	-	-	-	-
N7	4	4	22.44	2.05	23.94	3.54	22.86	2.47	20.39	0
N7 (A)	-	8	35.1	2.17	36.46	3.53	36.53	3.61	32.92	0
N8	104	21	259.46	49.42	255.29	45.25	**210.04**	**0**	216.23	6.19
N8 (A)	-	30	271.65	51.65	269.62	49.63	**220**	**0**	225.59	5.59

N9	18	6	18.48	1.36	19.78	2.66	18.52	1.41	17.11	0
N10	16	20	42.24	12.7	43.39	13.85	**29.54**	**0**	44.09	14.56
N10 (A)	-	24	53.2	8.63	55.18	10.61	**44.57**	**0**	54.23	9.66
N11	1	2	-	-	-	-	-	-	-	-
N11 (A)	-	4	7.96	0	9.96	2	10.93	2.97	9.17	1.2
N12	1	2	-	-	-	-	-	-	-	-
N12 (A)	-	5	10.29	0	12.25	1.96	14.23	3.95	12.25	1.97
N13	6	2	13.92	12.97	15.54	14.59	**0.95**	**0**	15.01	14.06
N14	74	16	146.21	35.53	144.33	33.64	**110.69**	**0**	117.24	6.56
N14 (A)	-	20	156.78	37.89	151.78	32.89	**118.88**	**0**	127.08	8.2
N15	156	14	270.06	189.64	210.78	130.37	**80.41**	**0**	96.37	15.96
N15 (A)	-	21	284.12	184.34	237.56	137.79	**99.78**	**0**	116.42	16.64
N16	26	15	80.53	50.81	60.48	30.76	29.72	0	**33.4**	**3.68**
N17	32	7	89.67	16.26	91.67	18.26	76.58	3.16	73.41	0
N17 (A)	-	13	101.86	17.78	103.42	19.34	87.27	3.19	84.08	0
N18	35	10	74.79	34.56	76.58	36.35	42.56	2.33	40.23	0
N19	0	6	-	-	-	-	-	-	-	-
N20	0	1	-	-	-	-	-	-	-	-
N21	28	5	80.65	2.23	81	2.58	79.75	1.33	78.42	0
N22	1	2	-	-	-	-	-	-	-	-
N23	1	2	-	-	-	-	-	-	-	-
N23 (A)	-	3	27.3	24	8.98	5.68	**3.3**	**0**	20.31	17.01

N24	4	1	10.93	6.02	9.53	4.62	4.92	0	11.8	6.88
N25	3	8	20.56	0	22.54	1.98	25.81	5.24	21.99	1.43
N25 (A)	-	9	21.06	0	23.04	1.99	26.35	5.29	22.49	1.44
N26	16	5	57.43	7.01	56.46	6.03	50.43	0	51.58	1.15
N27	8	7	37.64	7.38	30.25	0	30.72	0.47	38.19	7.93
N28	18	4	54.23	4.09	56.05	5.9	50.14	0	51.78	1.64
N28 (A)	-	5	55.54	4.56	57.3	6.32	**50.98**	**0**	53	2.02
N29	81	29	216.77	118.3	195.22	96.75	**98.47**	**0**	152.15	53.68
N29 (A)	-	33	227.31	110.43	207.24	90.36	**116.88**	**0**	166.09	49.21

Table A9. Models for network-level metrics weighted nestedness (wNODF), closeness (CC) and betweenness centralisation (BC) and weighted modularity (Q), including ant species as pollinators. The three competing models had no explanatory variable (model 1), proportion of social hymenopterans (I_S) as explanatory variable (model 2), proportion of highly eusocial social hymenopterans (I_E) as explanatory variable (model 3). Selected models (ΔAIC < 2) are shaded. AIC = Akaike's information criterion and ΔAIC = AIC of each model – AIC best model.

		wNODF		CC		BC		Q	
Models	Exp. Var.	AIC	ΔAIC	AIC	ΔAIC	AIC	ΔAIC	AIC	ΔAIC
Mod. 1	_____	166.7	0.0	122.5	0.0	188.6	0.0	186.5	0.0
Mod. 2	I_S	168.7	2.1	124.9	2.5	191.0	2.4	188.9	2.4
Mod. 3	I_E	169.0	2.3	123.7	1.3	190.8	2.2	188.4	1.9

Table A10. Correlation between the proportion of social and eusocial hymenopteran species (I_S and I_E, respectively) and species richness (number of hymenopteran, H, and of pollinator species, P) in the network.

	$\mathbf{I_S}$	$\mathbf{I_E}$
H	-0.46	-0.33
P	-0.38	-0.21

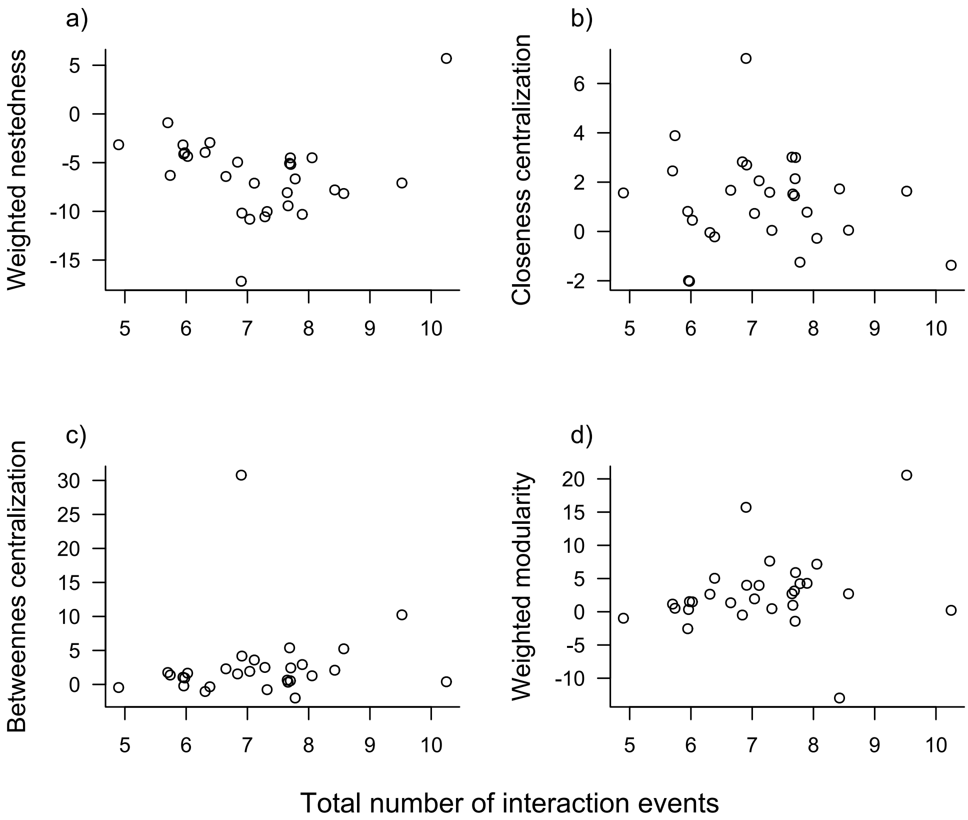

Figure A1. Relationship between total number of interaction events and network-level metrics. Each dot represents a network, number of interaction events were log transformed, and network-level metrics were *z*-scored: a) weighted nestedness, b) closeness centralisation, c) betweenness centralisation, and d) weighted modularity.

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