

Are cities hotspots for bees? Local and regional diversity patterns lead to different conclusions

Urban Ecosystems

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Table. Bee species occurring in three habitats along the urbanisation gradient in Poznań, Poland – 2014-2016.

Family	Species	Abundance				Polish Red List status
		Urban	Suburban	Rural	Total	
Colletidae	<i>Colletes cunicularius</i> (Linnaeus, 1761)	1	0	15	16	
Colletidae	<i>Colletes daviesanus</i> Smith, 1846	17	49	6	72	
Colletidae	<i>Colletes fodiens</i> (Fourcroy, 1785)	4	0	5	9	
Colletidae	<i>Colletes similis</i> Schenck, 1853	3	10	0	13	DD
Colletidae	<i>Colletes succinctus</i> (Linnaeus, 1758)	1	2	1	4	
Colletidae	<i>Hylaeus annularis</i> (Kirby, 1802)	2	5	0	7	
Colletidae	<i>Hylaeus angustatus</i> (Schenck, 1859)	12	6	0	18	
Colletidae	<i>Hylaeus bisinuatus</i> Förster, 1871	8	6	1	15	DD
Colletidae	<i>Hylaeus brevicornis</i> Nylander, 1852	0	3	0	3	
Colletidae	<i>Hylaeus communis</i> Nylander, 1852	7	11	5	23	
Colletidae	<i>Hylaeus confusus</i> Nylander, 1852	1	0	0	1	
Colletidae	<i>Hylaeus cornutus</i> Curtis, 1831	0	3	0	3	DD
Colletidae	<i>Hylaeus difformis</i> (Eversmann, 1852)	1	0	0	1	
Colletidae	<i>Hylaeus gibbus</i> Saunders, 1850	3	1	0	4	
Colletidae	<i>Hylaeus gracilicornis</i> (Morawitz, 1867)	0	0	1	1	DD
Colletidae	<i>Hylaeus gredleri</i> Förster, 1871	2	0	0	2	DD
Colletidae	<i>Hylaeus hyalinatus</i> Smith, 1842	14	18	0	32	
Colletidae	<i>Hylaeus lepidulus</i> Cockerell, 1924	1	0	0	1	
Colletidae	<i>Hylaeus pictipes</i> Nylander, 1852	1	0	0	1	DD
Colletidae	<i>Hylaeus rinki</i> (Gorski, 1852)	0	0	1	1	VU
Colletidae	<i>Hylaeus signatus</i> (Panzer, 1798)	0	2	0	2	DD
Andrenidae	<i>Andrena apicata</i> Smith, 1847	0	0	1	1	
Andrenidae	<i>Andrena barbilabris</i> (Kirby, 1802)	3	0	2	5	
Andrenidae	<i>Andrena bicolor</i> fabricius, 1775	1	4	0	5	
Andrenidae	<i>Andrena bimaculata</i> (Kirby, 1802)	1	0	3	4	DD
Andrenidae	<i>Andrena carbonaria</i> Linnaeus, 1767	0	4	0	4	
Andrenidae	<i>Andrena chrysoseles</i> (Kirby, 1802)	0	0	3	3	
Andrenidae	<i>Andrena cineraria</i> (Linnaeus, 1758)	0	1	4	5	
Andrenidae	<i>Andrena clarkella</i> (Kirby, 1802)	0	0	2	2	
Andrenidae	<i>Andrena combinata</i> (Christ, 1791)	0	0	1	1	
Andrenidae	<i>Andrena denticulata</i> (Kirby, 1802)	0	0	1	1	
Andrenidae	<i>Andrena dorsata</i> (Kirby, 1802)	6	12	5	23	
Andrenidae	<i>Andrena falsifica</i> Perkins, 1915	0	1	0	1	VU
Andrenidae	<i>Andrena flavipes</i> Panzer, 1799	36	46	2	84	
Andrenidae	<i>Andrena florea</i> Fabricius, 1793	0	4	0	4	VU
Andrenidae	<i>Andrena fucata</i> Smith, 1847	0	0	6	6	
Andrenidae	<i>Andrena fulva</i> (Müller, 1766)	17	16	26	59	
Andrenidae	<i>Andrena fulvago</i> (Christ, 1791)	1	0	0	1	
Andrenidae	<i>Andrena fuscipes</i> (Kirby, 1802)	2	0	0	2	
Andrenidae	<i>Andrena gelriae</i> van der Vecht, 1927	0	0	1	1	
Andrenidae	<i>Andrena gravida</i> Imhoff, 1899	8	4	12	24	
Andrenidae	<i>Andrena haemorrhhoa</i> (Fabricius, 1781)	32	72	132	236	
Andrenidae	<i>Andrena helvola</i> (Linnaeus, 1758)	2	5	37	44	

Andrenidae	<i>Andrena humilis</i> Imhoff, 1832	0	0	4	4	
Andrenidae	<i>Andrena jacobii</i> Perkins, 1921	0	2	6	8	
Andrenidae	<i>Andrena labiata</i> Fabricius, 1781	0	6	1	7	
Andrenidae	<i>Andrena limata</i> Smith, 1853	0	2	0	2	VU
Andrenidae	<i>Andrena minutula</i> (Kirby, 1802)	6	3	8	17	
Andrenidae	<i>Andrena minutuloides</i> Perkins, 1914	2	3	1	6	
Andrenidae	<i>Andrena nigroaenea</i> (Kirby, 1802)	14	1	6	21	
Andrenidae	<i>Andrena nitida</i> (Müller, 1776)	21	6	11	38	
Andrenidae	<i>Andrena pilipes</i> Fabricius, 1781	0	1	1	2	
Andrenidae	<i>Andrena praecox</i> (Scopoli, 1763)	0	4	0	4	
Andrenidae	<i>Andrena propinqua</i> Schenck, 1853	2	42	1	45	
Andrenidae	<i>Andrena subopaca</i> Nylander, 1848	5	9	70	84	
Andrenidae	<i>Andrena tibialis</i> (Kirby, 1802)	5	0	3	8	
Andrenidae	<i>Andrena vaga</i> Panzer, 1799	8	89	34	131	
Andrenidae	<i>Andrena varians</i> (Rossi, 1792)	1	0	0	1	
Andrenidae	<i>Andrena ventralis</i> Imhoff, 1832	0	25	3	28	
Andrenidae	<i>Andrena wilkella</i> (Kirby, 1802)	1	0	2	3	
Andrenidae	<i>Panurgus calcaratus</i> (Scopoli, 1763)	8	15	18	41	
Halictidae	<i>Dufourea minuta</i> Lapeletier, 1845	0	2	0	2	DD
Halictidae	<i>Evyllaesus aeratus</i> (Kirby, 1802)	0	0	2	2	
Halictidae	<i>Evyllaesus albipes</i> (Fabricius, 1781)	16	44	6	66	
Halictidae	<i>Evyllaesus brevicornis</i> (Schenck, 1863)	4	3	0	7	DD
Halictidae	<i>Evyllaesus calceatus</i> (Scopoli, 1763)	32	95	28	155	
Halictidae	<i>Evyllaesus fulvicornis</i> (Kirby, 1802)	1	0	1	2	
Halictidae	<i>Evyllaesus laticeps</i> (Schenck, 1868)	24	10	1	35	
Halictidae	<i>Evyllaesus leucopus</i> (Kirby, 1802)	0	2	1	3	
Halictidae	<i>Evyllaesus linearis</i> (Schenck, 1869)	2	1	0	3	
Halictidae	<i>Evyllaesus lucidulus</i> (Schenck, 1861)	5	5	0	10	
Halictidae	<i>Evyllaesus minutissimus</i> (Kirby, 1802)	2	0	0	2	
Halictidae	<i>Evyllaesus morio</i> (Fabricius, 1793)	55	66	0	121	
Halictidae	<i>Evyllaesus nitidulus</i> (Fabricius, 1804)	4	5	0	9	
Halictidae	<i>Evyllaesus parvulus</i> (Schenck, 1853)	4	1	5	10	
Halictidae	<i>Evyllaesus pauxillus</i> (Schenck, 1853)	92	9	27	128	
Halictidae	<i>Evyllaesus punctatissimus</i> (Schenck, 1853)	0	0	2	2	
Halictidae	<i>Evyllaesus sexstrigatus</i> (Schenck, 1868)	9	16	15	40	
Halictidae	<i>Evyllaesus villosulus</i> (Kirby, 1802)	1	3	24	28	
Halictidae	<i>Halictus maculatus</i> (Smith, 1828)	0	1	0	1	
Halictidae	<i>Halictus quadricinctus</i> (Fabricius, 1776)	0	1	1	2	
Halictidae	<i>Halictus rubicundus</i> (Christ, 1791)	16	57	4	77	
Halictidae	<i>Halictus sexcinctus</i> (Fabricius, 1775)	1	5	33	39	
Halictidae	<i>Lasioglossum costulatum</i> (Kriechbaumer, 1873)	0	0	1	1	
Halictidae	<i>Lasioglossum laevigatum</i> (Kirby, 1802)	0	0	2	2	
Halictidae	<i>Lasioglossum lativentre</i> (Schenck, 1853)	0	0	3	3	
Halictidae	<i>Lasioglossum leucozonium</i> (Schrank, 1781)	2	3	34	39	
Halictidae	<i>Lasioglossum majus</i> (Nylander, 1852)	0	0	4	4	
Halictidae	<i>Lasioglossum quarinotatum</i> (Kirby, 1802)	0	0	1	1	
Halictidae	<i>Lasioglossum sexnotatum</i> (Kirby, 1802)	9	24	11	44	
Halictidae	<i>Lasioglossum subfasciatum</i> (Imhoff, 1832)	0	0	3	3	
Halictidae	<i>Lasioglossum zonulum</i> (Smith, 1848)	0	0	2	2	

Halictidae	<i>Seladonia confusa</i> (Smith, 1853)	33	7	10	50	
Halictidae	<i>Seladonia leucahenea</i> (Ebmer, 1972)	0	3	2	5	
Halictidae	<i>Seladonia semitecta</i> (Morawitz, 1874)	0	1	0	1	DD
Halictidae	<i>Seladonia subaurata</i> (Rossi, 1792)	49	56	8	113	
Halictidae	<i>Seladonia tumulorum</i> (Linnaeus, 1758)	41	23	28	92	
Halictidae	<i>Sphecodes albilabris</i> (Fabricius, 1793)	0	6	6	12	
Halictidae	<i>Sphecodes crassus</i> Thomson, 1870	5	0	0	5	
Halictidae	<i>Sphecodes ephippius</i> (Linnaeus, 1767)	0	2	4	6	
Halictidae	<i>Sphecodes gibbus</i> (Linnaeus, 1758)	1	2	9	12	
Halictidae	<i>Sphecodes longulus</i> Hagens, 1882	0	1	0	1	
Halictidae	<i>Sphecodes puncticeps</i> Thomson, 1870	0	1	0	1	
Melittidae	<i>Dasypoda hirtipes</i> (Harris, 1780)	20	114	169	303	
Melittidae	<i>Macropis europaea</i> Warncke, 1973	0	1	0	1	
Melittidae	<i>Melitta leporina</i> (Panzer, 1799)	27	5	3	35	
Megachilidae	<i>Anthidiellum strigatum</i> (Panzer, 1805)	0	0	2	2	
Megachilidae	<i>Anthidium manicatum</i> (Fabricius, 1775)	0	10	1	11	
Megachilidae	<i>Anthocopa papaveris</i> (Latreille, 1799)	0	0	3	3	VU
Megachilidae	<i>Anthocopa spinulosa</i> (Kirby, 1802)	0	2	1	3	
Megachilidae	<i>Chalicodoma ericetorum</i> (Lepeletier, 1841)	1	11	1	13	
Megachilidae	<i>Chelostoma florissomme</i> (Linnaeus, 1758)	0	0	4	4	
Megachilidae	<i>Chelostoma rapunculi</i> (Lepeletier, 1841)	0	18	0	18	
Megachilidae	<i>Coelioxys alata</i> (Förster, 1853)	0	1	0	1	DD
Megachilidae	<i>Coelioxys conoidea</i> (Illiger, 1806)	0	4	1	5	
Megachilidae	<i>Coelioxys quadridentata</i> (Linnaeus, 1758)	2	0	1	3	
Megachilidae	<i>Heriades crenulatus</i> Nylander, 1856	1	5	6	12	
Megachilidae	<i>Heriades truncorum</i> (Linnaeus, 1758)	3	51	5	59	
Megachilidae	<i>Hoplitis adunca</i> (Panzer, 1798)	7	16	13	36	
Megachilidae	<i>Hoplitis anthocopoides</i> (Schenck, 1853)	0	0	1	1	
Megachilidae	<i>Hoplitis leucomelena</i> (Kirby, 1802)	2	2	1	5	
Megachilidae	<i>Megachile centuncularis</i> (Linnaeus, 1758)	0	0	1	1	
Megachilidae	<i>Megachile circumcincta</i> (Kirby, 1802)	0	4	11	15	
Megachilidae	<i>Megachile lagopoda</i> (Linnaeus, 1761)	0	3	0	3	
Megachilidae	<i>Megachile ligniseca</i> (Kirby, 1802)	1	2	3	6	
Megachilidae	<i>Megachile nigriventris</i> Schenck, 1868	2	4	1	7	LC
Megachilidae	<i>Megachile rotundata</i> (Fabricius, 1784)	2	4	0	6	
Megachilidae	<i>Megachile versicolor</i> Smith, 1844	1	2	3	6	
Megachilidae	<i>Megachile willughbiella</i> (Kirby, 1802)	3	21	4	28	
Megachilidae	<i>Osmia aurulenta</i> (Panzer, 1799)	0	12	1	13	
Megachilidae	<i>Osmia brevicornis</i> (Fabricius, 1798)	0	1	0	1	
Megachilidae	<i>Osmia caerulescens</i> (Linnaeus, 1758)	1	16	1	18	
Megachilidae	<i>Osmia mustelina</i> Gerstaecker, 1869	0	3	1	4	
Megachilidae	<i>Osmia rufa</i> (Linnaeus, 1758)	28	65	4	97	
Megachilidae	<i>Proanthidium oblongatum</i> Latreille, 1809	0	1	1	2	VU
Megachilidae	<i>Stelis breviscula</i> (Nylander, 1848)	1	0	1	2	
Megachilidae	<i>Stelis punctulatissima</i> (Kirby, 1802)	0	1	0	1	
Apidae	<i>Anthophora bimaculata</i> (Panzer, 1798)	0	5	12	17	
Apidae	<i>Anthophora furcata</i> (Panzer, 1798)	0	3	0	3	
Apidae	<i>Anthophora plumipes</i> (Pallas, 1772)	75	110	37	222	
Apidae	<i>Anthophora quadrimaculata</i> (Panzer, 1806)	4	10	0	14	

Apidae	<i>Anthophora retusa</i> (Linnaeus, 1758)	0	0	1	1	
Apidae	<i>Apis mellifera</i> Linnaeus, 1758	508	402	247	1157	
Apidae	<i>Bombus bohemicus</i> (Seidl, 1838)	0	2	9	11	
Apidae	<i>Bombus hortorum</i> (Linnaeus, 1761)	16	13	7	36	
Apidae	<i>Bombus hypnorum</i> (Linnaeus, 1758)	27	15	3	45	
Apidae	<i>Bombus jonellus</i> (Kirby, 1802)	3	0	0	3	VU
Apidae	<i>Bombus lapidarius</i> (Linnaeus, 1758)	272	220	99	591	
Apidae	<i>Bombus pascuorum</i> (Scopoli, 1763)	441	291	180	912	
Apidae	<i>Bombus pratorum</i> (Linnaeus, 1761)	2	30	20	52	
Apidae	<i>Bombus ruderarius</i> (Muller, 1776)	11	17	7	35	
Apidae	<i>Bombus rupestris</i> (Fabricius 1793)	0	0	7	7	
Apidae	<i>Bombus</i> s. str. (<i>Terrestribombus</i>)	226	178	137	541	
Apidae	<i>Bombus sylvarum</i> (Linnaeus, 1761)	2	3	5	10	
Apidae	<i>Bombus sylvestris</i> (Lepeletier 1832)	1	1	1	3	
Apidae	<i>Bombus vestalis</i> (Fourcroy, 1785)	0	0	1	1	
Apidae	<i>Bombus veteranus</i> (Fabricius, 1793)	8	5	6	19	VU
Apidae	<i>Ceratina cyanea</i> (Kirby, 1802)	0	5	5	10	
Apidae	<i>Epeolus variegatus</i> (Linnaeus, 1758)	0	2	3	5	
Apidae	<i>Eucera longicornis</i> (Linnaeus, 1758)	0	1	0	1	
Apidae	<i>Melecta punctata</i> (Fabricius, 1775)	2	6	3	11	
Apidae	<i>Nomada alboguttata</i> Herrich-Schäffer, 1839	0	1	0	1	
Apidae	<i>Nomada bifasciata</i> Olivier, 1811	1	0	0	1	DD
Apidae	<i>Nomada bifida</i> Thomson, 1872	0	0	9	9	
Apidae	<i>Nomada femoralis</i> Morawitz, 1869	0	0	1	1	
Apidae	<i>Nomada flavoguttata</i> (Kirby, 1802)	0	0	12	12	
Apidae	<i>Nomada flavopicta</i> (Kirby, 1802)	1	2	0	3	
Apidae	<i>Nomada fulvicornis</i> Fabricius, 1793	0	0	4	4	
Apidae	<i>Nomada fuscicornis</i> Nylander, 1848	0	0	1	1	
Apidae	<i>Nomada lathburiana</i> (Kirby, 1802)	0	0	8	8	
Apidae	<i>Nomada marshamella</i> (Kirby, 1802)	0	0	3	3	
Apidae	<i>Nomada moeschleri</i> Alfken, 1913	1	9	10	20	LC
Apidae	<i>Nomada rufipes</i> Fabricius 1793	0	0	1	1	
Apidae	<i>Nomada signata</i> Jurine, 1807	1	0	3	4	
Apidae	<i>Nomada striata</i> Fabricius, 1793	0	0	1	1	
Apidae	<i>Nomada zonata</i> Panzer, 1798	0	0	2	2	LC

VU – vulnerable, DD – data deficient , LC – least concern