

DOI: [10.26786/1920-7603\(2023\)725](https://doi.org/10.26786/1920-7603(2023)725)

Table S1. Literature compilation of wild bees that have been shown to pollinate crops. Some may be candidates to become commercially managed pollinators.

Family	Bee	Country	Crops	Selected References
Andrenidae	<i>Andrena flavipes</i> (Panzer, 1799)	India	Alfalfa	Batra (1977)
Andrenidae	<i>Andrena leaena</i> (Cameron, 1907)	India	Field Mustard, Raya, Taramira, Toria, Radish	Abrol (1985, 1986a, 1986b), Batra (1977), Kapil et al. (1971)
Andrenidae	<i>Andrena ovatula</i> (Kirby, 1802)	Egypt	Berseem, Alfalfa	Rashad (1985), Bohart (1972)
Andrenidae	<i>Andrena savignyi</i> (Spinola, 1838)	India	Sarson, Field Mustard, Rape, Raya, Taramira, Cabbage, Cauliflower, Cotton, Toria	Batra (1967, 1977), Crane & Walker (1983), Abrol (1985, 1986a, 1986b), Mohammad (1935), Kapil et al. (1971)
Apidae	<i>Amegilla chlorocyanea</i> (Cockerell, 1914)	Australia	Tomato	Hogendoorn et al. (2006)
Apidae	<i>Amegilla holmesi</i> (Rayment, 1947)	Australia	Tomato	Bell et al. (2006)
Apidae	<i>Amegilla subcoerulea</i> (Lepeletier, 1841)	India	Eggplant	Batra (1967)
Apidae	<i>Amegilla violacea</i> (Lepeletier, 1841)	India	Eggplant	Udayakumar et al. (2021)
Apidae	<i>Anthophora abrupta</i> (Say, 1837)	USA	Cranberry, Asparagus, Blackberry, Clover, Parsnip, Persimmon, Raspberry, Tomato	Batra (1977), Graham et al. (2015)
Apidae	<i>Anthophora confusa</i> (Smith, 1854)	India	Cotton	Batra (1977)
Apidae	<i>Anthophora pilipes villosula</i> (Smith, 1854)	USA, Japan	Blueberry	Stubbs & Drummond (1999)
Apidae	<i>Anthophora plagiata</i> (Illiger, 1806)	Poland	Forage Legumes	Crane & Walker (1983)
Apidae	<i>Bombus asiaticus</i> (Morawitz, 1875)	India	Red Clover, White Clover, Pea, Sweet Potato, Eggplant	Abrol (1987)
Apidae	<i>Bombus ephippiatus</i> (Say, 1837)	Mexico	Tomato	Vergara & Fonseca-Buendia (2012)
Apidae	<i>Bombus haemorrhoidalis</i> (Smith, 1852)	India	Apple	Batra (1984)
Apidae	<i>Bombus huntii</i> (Greene, 1860)	North America	Tomato	Strange (2015)
Apidae	<i>Bombus impatiens</i> (Cresson, 1863)	USA, Mexico, Canada	Blueberry, Tomato	Stubbs & Drummond (1999), Morandin et al. (2001), Campbell et al. 2017a
Apidae	<i>Bombus lapidarius</i> (L., 1758)	Finland, United Kingdom	Red Clover, Raspberry	Valle & Aaltonen (1969), Lye et al. (2011)

Table S1 continued

Family	Bee	Country	Crops	Selected References
Apidae	<i>Bombus mixtus</i> (Cresson, 1879)	USA	Cranberry	Johansen (1967)
Apidae	<i>Bombus occidentalis</i> (Greene, 1858)	North America	Tomato, Cranberry	Velthuis & van Doorn (2004), Kremen et al. (2002), Macfarlane et al. (1994)
Apidae	<i>Bombus</i> spp.	Canada, USA	Tomato, Sweet Pepper, Eggplant, Courgette, Melon, Pumpkin, Red and Black Currant, Raspberry, Strawberry, Apple, Pear, Peach, Apricot, Plum, Cherry, Kiwi, Blueberry, Cranberry, Cicer Milkvetch (Legume)	Velthuis & van Doorn (2004), Richards & Myers (1997), Joshi et al. (2015)
Apidae	<i>Bombus terrestris</i>	Poland (Europe), New Zealand, Tasmania, Chile, Israel, Turkey, Morocco, Japan, South Korea	Tomato, Pak Choi (Brassica), Kiwi, Alfalfa, Red Clover, Cotton, Hot Pepper, Pear	Pinchinat et al. (1979), Rader et al. (2009), Read et al. (1989), Velthuis & van Doorn (2004), Ruz (2002), Saeed et al. (2012), Kwon & Saeed (2003), Zisovich et al. (2012)
Apidae	<i>Bombus terrestris audax</i> (Harris, 1776)	United Kingdom	Raspberry	Lye et al. (2011)
Apidae	<i>Bombus trifasciatus</i> (Smith, 1852)	India	Red Clover, White Clover, Pea, Sweet Potato	Abrol (1987)
Apidae	<i>Bombus vosnesenskii</i> (Radoszkowski, 1862)	North America	Tomato, Cranberry	Dogterom et al. (1998), Phillips (2011)
Apidae	<i>Braunsapis</i> spp. (Michener, 1969)	India	Alfalfa, Pea, Carrot	Kapil and Jain (1979), Batra (1967)
Apidae	<i>Centris analis</i> (Lepeletier, 1841)	Brazil, (Central and South America)	Acerola (Barbados Cherry), Malpigh	Oliveira & Schlindwein (2009), Buchmann (2004)
Apidae	<i>Centris inermis</i> (Friese, 1900)	(Central and South America)	Malpighia	Buchmann (2004)
Apidae	<i>Centris</i> spp. (Fabricius, 1804)	Brazil	Nance/Murici, Malpighia	Buchmann (2004)
Apidae	<i>Centris tarsata</i> (Smith, 1874)	Brazil	Cashew	Freitas & Paxton (1998)
Apidae	<i>Habropoda laboriosa</i> (Fabricius, 1804)	USA	Blueberry	Cane (1994)
Apidae	<i>Melipona fasciculata</i> (Smith, 1854)	Brazil	Eggplant	Nunes-Silva et al. (2013)
Apidae	<i>Melipona quadrifasciata</i> (Lepeletier, 1836)	Brazil	Tomato	Del Sarto et al. (2005)
Apidae	<i>Melipona</i> spp. (Illiger, 1806)	Angola, India, Australia, Brazil, Japan	Litchee, Mango, Strawberry	Crane & Walker (1983), Abrol (2012)
Apidae	<i>Melissodes agilis</i> (Cresson, 1879)	USA	Sunflower	Parker et al. (1981)

Table S1 continued

Family	Bee	Country	Crops	Selected References
Apidae	<i>Nannotrigona perilampoides</i> (Cresson, 1879)	Mexico	Tomato	Palma et al. (2008)
Apidae	<i>Nannotrigona testaceicornis</i> (Lepeletier, 1836)	Costa Rica	Mealy Sage	Slaa et al. (2000)
Apidae	<i>Peponapis pruinosa</i> (Say, 1837)	USA	Cucurbits	Crane & Walker (1983)
Apidae	<i>Pithitis smaragdula</i> (Fabricius, 1787)	India	Alfalfa, Berseem, Cabbage, Cauliflower, Smooth Loofah, Cucumber, Carrot, Butter Gourd	Batra (1967, 1977, 1978), Kapil et al. (1971, 1974), Abrol (1985, 1986a)
Apidae	<i>Pithitis</i> spp. (Klug, 1807)	India	Eggplant, Apple	Batra (1967, 1984)
Apidae	<i>Scaptotrigona mexicana</i> (Guérin-Méneville, 1844)	Mexico	Rambutan	Guzmán-Díaz et al. (2005), Esponda-Muñoz et al. (2005)
Apidae	<i>Tetragonisca angustula</i> (Latreille, 1811)	Mexico, Costa Rica	Rambutan, Tomato, Salvia farinacea	Slaa et al. (2006), Palma et al. (2008), Slaa et al. (2000)
Apidae	<i>Tetragonula carbonaria</i> (Smith, 1854)	Australia	Macadamia Nut	Cortopassi-Laurino et al. (2006)
Apidae	<i>Tetragonula hockingsi</i> (Cockerell, 1929)	Australia	Macadamia Nut	Cortopassi-Laurino et al. (2006)
Apidae	<i>Tetralonia</i> spp. (Spinola, 1838)	India	Sarson, Ghiya tori	Batra (1977)
Apidae	<i>Trigona ruficrus</i> (Fabricius, 1793)	Brazil	Gourds	Crane & Walker (1983)
Apidae	<i>Trigona</i> spp. (Jurine, 1807)	India	Spondias	Crane & Walker (1983)
Apidae	<i>Xenoglossa</i> spp. Smith, 1854	USA	Cucurbits	Crane & Walker (1983)
Apidae	<i>Xylocopa amethystine</i> (Fabricius, 1793)	India	Sunhemp	Batra (1977)
Apidae	<i>Xylocopa caffra</i> (L., 1767)	S. Africa	Alfalfa	Watmough (1987)
Apidae	<i>Xylocopa fenestrata</i> (Fabricius, 1798)	India	Apple, Gourds, Pigeon Pea, Pea, Sweet Potato, Eggplant, Pumpkin, Squash, Smooth Loofah, Orange, Lemon, Citrus, Guava, Sunhemp, Onion, Coriander, Saunf	Atwal (1970), Crane & Walker (1983), Kapil et al. (1971, 1974, 1975), Abrol (1985, 1986b, 1987), Batra (1967, 1977, 1984)
Apidae	<i>Xylocopa (Lestis) aerates</i> (Smith, 1851)	Australia	Tomato	Grewal and Sidhu (1978), Kapil & Dhaliwal (1968), Abrol (1985, 1987) Hogendoorn et al. (2000)
Apidae	<i>Xylocopa (Lestis) bombylans</i> (Fabricius, 1775)	Australia	Tomato	Hogendoorn et al. (2000)

Table S1 continued

Family	Bee	Country	Crops	Selected References
Apidae	<i>Xylocopa mordax</i> (Smith, 1874)	St. Vincent	Yellow Passion Fruit	Crane & Walker (1983), Corbet & Willmer (1980)
Apidae	<i>Xylocopa pubescens</i> (Spinola, 1838)	India	Pigeon Pea, Sunhemp, Pea, Pumpkin, Squash, Smooth Loofah, Guava	Abrol (1985), Atwal (1970), Batra (1977), Kapil & Dhaliwal (1968), Kapil et al., (1971, 1975)
Apidae	<i>Xylocopa sonorina</i> (Smith, 1874)	Hawaii	Passion Fruit	Crane & Walker (1983)
Apidae	<i>Xylocopa</i> spp. (Latreille, 1802)	India	Mango, Luffa	Batra (1967, 1977)
Apidae	<i>Xylocopa valga</i> (Gerstäcker, 1872)	India	Almond, Cherry, Pear	Abrol (1987)
Colletidae	<i>Colletes inaequalis</i> (Say, 1837)	USA	Blueberry	Batra (1980)
Colletidae	<i>Colletes lacunatus</i> (Dours, 1872)	India	Apple, Taramira, Raddish	Batra (1967, 1977)
Colletidae	<i>Colletes</i> spp. (Latreille, 1802)	India	Taramira, Raddish, Toria	Kapil et al. (1971), Batra (1967, 1977)
Colletidae	<i>Colletes thoracicus</i> (Smith, 1853)	USA	Blueberry	Batra (1980)
Colletidae	<i>Colletes validus</i> (Cresson, 1868)	USA	Blueberry	Batra (1980)
Colletidae	<i>Leioproctus</i> sp. (Smith, 1853)	New Zealand	Pak Choi	Rader et al. (2009)
Halictidae	<i>Halictus</i> spp. (Latreille, 1804)	India	Apple	Batra (1984)
Halictidae	<i>Lasioglossum albescens</i> (Smith, 1853)	India	Luffa	Batra (1977)
Halictidae	<i>Lasioglossum</i> spp.	India	Apple, Almond, Berseem, Luffa, Eggplant, Pea, Onion, Cabbage, , Cucumbers, Carrot, Jowain, Orange, Lemon, Citrus, Pomegranate	Abrol (1987), Batra (1967, 1977)
Halictidae	<i>Nomia callichlora</i> (Cockerell, 1911)	India	Eggplant	Batra (1977)
Halictidae	<i>Nomia capitata</i> (Smith, 1875)	India	Indigo	Batra (1977)
Halictidae	<i>Nomia curvipes</i> (Fabricius, 1793)	India	Luffa	Batra (1977)
Halictidae	<i>Nomia eburneigera</i>	India	Luffa	Batra (1977)
Halictidae	<i>Nomia melanderi</i> (Cockerell, 1906)	USA	Alfalfa	Crane & Walker (1983), Cane (2008)
Halictidae	<i>Nomia oxybeloides</i> (Smith, 1875)	India	Alfalfa, Eggplant	Kapil et al. (1974), Abrol (1986b), Batra (1977)
Halictidae	<i>Nomia ruficornis</i> (Spinola, 1838)	Egypt		Crane & Walker (1983)
Halictidae	<i>Nomia</i> spp.	India	Raddish, Cucumbers, Mango, Apple, Cherry, Pear, Alfalfa, Red Clover, Cotton	Abrol (1987), Batra (1967, 1984)

Table S1 continued

Family	Bee	Country	Crops	Selected References
Halictidae	<i>Nomioides</i> spp. (Schenck, 1867)	India	Onion, Pumpkin, Squash, Corriander, Carrot, Jowain, Pomegranate, Butter Gourd	Kapil et al. (1975), Abrol (1985, 1987), Atwal (1970), Batra (1967, 1977)
Halictidae	<i>Nomioides variegata</i> (Olivier)	India	Cucumbers, Raddish	Batra (1977)
Halictidae	<i>Rophitoides canus</i> (Eversmann, 1852)	Ukraine	Alfalfa	Crane & Walker (1983)
Megachilidae	<i>Callithrix flaviceps</i> (Thomas, 1903)	India	Alfalfa, Berseem	Kapil et al. (1974, 1975), Abrol (1986b, 1986b)
Megachilidae	<i>Chalicodoma</i> spp. (Lepeletier, 1841)	Egypt	Alfalfa, Onion	Crane & Walker (1983), Rashad (1985)
Megachilidae	<i>Megachile anthracina</i> (Smith, 1853)	India	Sunhemp	Batra (1977)
Megachilidae	<i>Megachile bicolor</i> (Pasteels, 1973)	India	Alfalfa, Pigeon pea, Sunhemp	Kapil et al. (1974), Abrol (1985, 1986c, 1987), Chaudhary and Jain (1978)
Megachilidae	<i>Megachile cephalotes</i> Smith, 1853	India	Alfalfa, Pigeon pea, Pea	Kapil et al. (1975), Abrol (1985), Chaudhary & Jain (1978)
Megachilidae	<i>Megachile coelioxoides</i> Cresson, 1878	India	Luffa	Batra (1977)
Megachilidae	<i>Megachile concinna</i> Smith, 1879	Eurasia	Alfalfa	Bohart (1972)
Megachilidae	<i>Megachile femoratella</i> Cockerell, 1918	India	Alfalfa, Pigeon pea	Kapil et al. (1974, 1975), Abrol (1986c), Chaudhary & Jain (1978)
Megachilidae	<i>Megachile flavipes</i> Spinola, 1838	India	Alfalfa, Alfalfa, Pigeon Pea	Abrol (1985), Batra (1977), Crane & Walker (1983), Chaudhary & Jain (1978)
Megachilidae	<i>Megachile gratiosa</i> Gerstäcker, 1858	S. Africa	Alfalfa	Watmough (1987)
Megachilidae	<i>Megachile lanata</i> (Fabricius, 1775)	India, USA	Alfalfa, Pigeon pea, Sunhemp, Pea, Guava	Batra (1977), Kapil et al. (1974, 1975), Grewal and Sidhu (1978), Abrol (1985, 1986c), Hensen et al. 2019
Megachilidae	<i>Megachile nana</i> Bingham, 1897	India	Alfalfa, Berseem	Kapil et al. (1975), Abrol (1986b)
Megachilidae	<i>Megachile pugnata</i> Say, 1837	N. America	Sunflower	Peterson & Artz (2014)
Megachilidae	<i>Megachile rotundata</i> (Fabricius, 1787)	USA, Chile, Canada, New Zealand	Alfalfa, Blueberry, Canola	Crane & Walker (1983), MacKenzie et al. (1997), Donovan et al. (1982)
Megachilidae	<i>Megachile</i> spp. Latreille, 1802	Poland, India	Forage Legumes, Field Mustard, Mango	Batra (1967), Crane & Walker (1983), Kapil et al. (1971)
Megachilidae	<i>Megachile submucida</i> Alfken, 1926	Egypt	Berseem	Crane & Walker (1983)

Table S1 continued

Family	Bee	Country	Crops	Selected References
Megachilidae	<i>Osmia aglaia</i> Sandhouse, 1939	USA	Raspberry and blackberry	Cane (2005)
Megachilidae	<i>Osmia atriventris</i> Cresson, 1864	USA	Blueberry	Drummond & Stubbs (1999)
Megachilidae	<i>Osmia bicornis</i> (L., 1758)	Germany	Apple, Tree Fruit	Gruber et al. (2011), Schindler & Peters (2011)
Megachilidae	<i>Osmia bruneri</i> Cockerell, 1897	N. America	Legume	Cane (2008)
Megachilidae	<i>Osmia coerulescens</i> (L., 1758)	France, New Zealand	Alfalfa, Legume seed crops	Tasei (1972), Purves et al. (1998)
Megachilidae	<i>Osmia cornifrons</i> (Radoszkowski, 1887)	Japan, India, USA, Korea, China, Denmark	Apple, Plums, Blueberry, Sweet Pepper	Batra (1967), Crane & Walker (1983), West & McCutcheon (2009), Xu et al. (1995), Kristjansson & Rasmussen (1991)
Megachilidae	<i>Osmia cornuta</i> (Latreille, 1805)	Spain, Italy, France, Yugoslavia	Tree Fruit, blackberry, Apple, Cabbage, Alfalfa, White Clover, Apricot, Almond	Asensio (1984), Vicens & Bosch (2000), Bosch & Kemp (2002), Kronic et al. (2001)
Megachilidae	<i>Osmia latreillei</i> (Spinola, 1806)	Egypt	Berseem	Rashad (1985)
Megachilidae	<i>Osmia lignaria</i> Say, 1837	USA, Canada	Almond, Apple, Cherry, Prune	Crane & Walker (1983), Bosch & Kemp (2015), Sheffield et al. (2008), Torchio (1976)
Megachilidae	<i>Osmia ribifloris</i> Cockerell, 1900	USA (North America)	Blueberry	Torchio (1990)
Megachilidae	<i>Osmia rufa</i> (L., 1758)	Denmark, Italy, Great Britain	Brassicas, Plum, Alfalfa, White Clover, Cherry, Apple, Pear	Holm (1973), Peterson & Artz (2014)
Megachilidae	<i>Osmia sanrafaelae</i> Parker, 1985	USA	Alfalfa	Parker (1985)
Megachilidae	<i>Osmia</i> spp. Panzer, 1806	Poland, India	Apple, Blackberry, Strawberry, Raspberry, Apple, Plum, Almond	Batra (1984), Crane & Walker (1983)
Megachilidae	<i>Osmia tersula</i> Cockerell, 1912	Canada	Apples and other tree fruits	Sheffield et al. (2008)
Melittidae	<i>Melitta leporina</i> (Panzer, 1799)	Eurasia	Alfalfa	Bohart (1972)

REFERENCES CITED

- Abrol DP (1985) Analysis of biophysical interactions in causing foraging behavior of some bees- a study in bioenergetics. Ph.D. thesis, Haryana Agricultural University, Hisar.
- Abrol DP (1986a) Wing beat frequencies of *Andrena ilderda* and *Andrena leaena* (Hymenoptera, Andrenidae). *Annals of Biology (Ludhiana)* 2:98-99.
- Abrol DP (1986b) Ecophysiological adaptations between pollinating bees and their flowers. *Environmental Ecology* 4:161-162.
- Abrol DP (1986c) Time and energy budgets of alfalfa pollinating bees *Megachile nana* and *Megachile flavipes* Spinola (Hymenoptera, Megachilidae). *Proceedings of the Indian Academy of Sciences Animal Sciences* 95:579–586. <https://doi.org/10.1007/BF03179421>

- Abrol DP (1987) Analysis of environmental factors affecting foraging behaviour of *Megachile bicolor* F. on *Crotalaria juncea* L. Bangladesh Journal of Agricultural Research 12:5–14.
- Asensio E (1984) *Osmia (Osmia) cornuta* Latr pollinisateur potentiel des arbres fruitiers en Espagne (Hymenoptera, Megachilidae). In: Proc. V Symp. Int. sur la Pollinisation, 27-30 September 1983, Versailles, pp. 461-465.
- Atwal AS (1970) Insect pollinators of crops. Punjab Agricultural University Press, Ludhiana.
- Batra SWT (1967) Crop pollination and the flower relationships of the wild bees of Ludhiana, India. Journal of the Kansas Entomological Society 40:164–77.
- Batra SWT (1977) Bees of India (Apoidea): their behaviour, management, and a key to the genera. Oriental Insects 11:289–324. <https://doi.org/10.1080/00305316.1977.10433811>
- Batra SWT (1978) *Osmia cornifrons* and *Pithitis smaragdula*, two Asian bees introduced into the United States for crop pollination. In Proceedings of the 6th International Symposium on Pollination. Maryland Agricultural Experiment Station Special Miscellaneous Publication 1:307–312.
- Batra SWT (1980) Ecology, behavior, pheromones, parasites and management of the sympatric vernal bees *Colletes inaequalis*, *C. thoracicus*, and *C. validus*. Journal of the Kansas Entomological Society 53:509–538.
- Batra SWT (1984) Solitary bees. Scientific American 259:120-127. <https://doi.org/10.1038/scientificamerican0284-120>
- Bell MC, Spooner-Hart RN, Haigh AM (2006) Pollination of greenhouse tomatoes by the Australian bluebanded bee *Amegilla (zonamegilla) holmesi* (Hymenoptera: Apidae). Journal of Economic Entomology 99:437-442. <https://doi.org/10.1093/jee/99.2.437>
- Buchmann SL (2004) Aspects of centridine biology (*Centris* spp.), importance for pollination, and use of *Xylocopa* spp. as greenhouse pollinators of tomatoes and other crops. In: B. M. Freitas and J.O.P. Pereira [eds.], Solitary bees: conservation, rearing and management for pollination. University Press, Fortaleza, Brazil.
- Campbell JW, O'Brien J, Irvin JH, Kimmel CB, Daniels JC, Ellis JD (2017a) Managed bumble bees (*Bombus impatiens*) (Hymenoptera: Apidae) caged with blueberry bushes at high density did not increase fruit set or fruit weight compared to open pollination. Environmental Entomology 46:237-242. <https://doi.org/10.1093/ee/nvx044>
- Cane JH (1994) Nesting biology and mating behavior of the southeastern blueberry bee, *Habropoda laboriosa* (Hymenoptera: Apoidea) Journal of the Kansas Entomological Society 67:236–241.
- Cane JH (2008) A native ground-nesting bee (*Nomia melanderi*) sustainably managed to pollinate alfalfa across an intensively agricultural landscape. Apidologie 39(3):315-323. <https://doi.org/10.1051/apido:2008013>
- Chaudhary JR, Jain KL (1978) Nesting and foraging behaviour of a mason bee, *Megachile lanata* (Megachilidae: Hymenoptera). Indian Journal of Entomology 40:405–411.
- Corbet SA, Willmer PG (1980) Pollination of the yellow passion fruit: nectar, pollen and carpenter bees. Journal of Agriculture Science 95:655-666. <https://doi.org/10.1017/S0021859600088055>
- Cortopassi-Laurino M, Imperatriz-Fonseca VL, Roubik DW, Dollin A, Heard T, Aguilar I, Venturieri GC, Eardley C, Nogueira-Neto (2006) Global meliponiculture: challenges and opportunities. Apidologie 37: 275–292 <https://doi.org/10.1051/apido:2006027>
- Crane E, Walker P (1983) The impact of pest management on bees and pollination. Tropical Development and Research Institute, College House, Wrights Lane, London.
- Del Sarto MCL, Peruquetti RC, Campos LA (2005) Evaluation of the neotropical stingless bee *Melipona quadrifasciata* (Hymenoptera: Apidae) as pollinator of greenhouse tomatoes. Journal of Economic Entomology 98:260–266. <https://doi.org/10.1093/jee/98.2.260>
- Dogterom MH, Matteoni JA, Plowright RC (1998) Pollination of greenhouse tomatoes by the North American *Bombus vosnesenski* (Hymenoptera: Apidae). Journal of Economic Entomology 91:71–75. <https://doi.org/10.1093/jee/91.1.71>

- Donovan BJ, Read PEC, Wier SS, Griffin RP (1982) Introduction and propagation of the leafcutting bee *Megachile rotundata* (F.) in New Zealand. In: Proceedings of the first international symposium on alfalfa leafcutting bee management 212–222. Saskatoon, Saskatchewan, Canada: University of Saskatchewan.
- Drummond FA, Stubbs CS (1997) Potential for management of the blueberry bee, *Osmia atriventris* Cresson. Proceedings, 6th International Symposium on *Vaccinium* Culture. Acta Horticulturae 446:77–85. <https://doi.org/10.17660/ActaHortic.1997.446.10>
- Esponda-Muñoz JA, Rincón RM, Guzmán DMA, Vandame R (2005) Efecto de la densidad de abejas *S. mexicana* en la producción de rambután (*Nephelium lappaceum* L.) en el Soconusco, Chiapas, pp. 1–5. *En* Memorias del IV Seminario Mesoamericano sobre Abejas sin Aguijón.
- Freitas BM, Paxton RJ (1998)** A comparison of two pollinators: the introduced honey bee *Apis mellifera* and an indigenous bee *Centris tarsata* on cashew *Anacardium occidentale* in its native range of NE Brazil. Journal of Applied Ecology 35:109–21.
- Graham JR, Willcox E, Ellis JD (2015) The potential management of a ground-nesting, solitary bee: *Anthophora abrupta* (Hymenoptera: Apidae). Florida Entomologist 98:528–535. <https://doi.org/10.1653/024.098.0220>
- Grewal GS, Sidhu AS (1978) Insect pollination of some cucurbits in Punjab. Indian Journal of Agricultural Science 48:79–83.
- Gruber B, Echel K, Everaars J, Dormann CF (2011) On managing the red mason bee (*Osmia bicornis*) in apple orchards. Apidologie 42:564–676. <https://doi.org/10.1007/s13592-011-0059-z>
- Guzmán-Díaz C, García J, Esponda JA, Vandame R, Padilla M, Rincón M, Roubik D (2005) Influencia de la densidad y distribución de *Scaptotrigona mexicana* Guérin-Meneville (Apidae: Meliponini) en la producción de frutos de rambután (*Nephelium lappaceum* L.) en la región del Soconusco, Chiapas, México, pp. 1–7. *En* Memorias del IV Seminario Mesoamericano sobre Abejas sin Aguijón.
- Henson KA, Campbell JW, Kaplan DA (2019) Range extension of *Megachile lanata* (Hymenoptera: Megachilidae), a non-native sunn hemp pollinator, in Florida. Florida Entomologist 102:259–261. <https://doi.org/10.1653/024.102.0148>
- Hogendoorn K, Gross CL, Sedgley M, Keller MA (2006). Increased tomato yield through pollination by native Australian *Amegilla chlorocyanea* (Hymenoptera: Anthophoridae). Journal of Economic Entomology 99:828–833. <https://doi.org/10.1093/jee/99.3.828>
- Hogendoorn K, Steen Z, Schwarz MP (2000) Native Australian carpenter bees as a potential alternative to introducing bumble bees for tomato pollination in greenhouses. Journal of Apicultural Research 39:67–74. <https://doi.org/10.1080/00218839.2000.11101023>
- Holm SN (1973) *Osmia rufa* L. (Hym. Megachilidae) as a pollinator of plants in greenhouses. Entomologica Scandinavica 4:217–24. <https://doi.org/10.1163/1876312X74X00074>
- Johansen C (1967) Encouraging the bumble bee pollinator of cranberries. Publ. co-op. Ext. Serv. Wash. St. Univ. EM2262:
- Joshi NK, Leslie T, Rajotte EG, Kammerer MA, Otieno M, Biddinger DJ (2015) Comparative trapping efficiency to characterize bee abundance, diversity, and community composition in apple orchards. Annals of the Entomological Society of America 108:785–799. <https://doi.org/10.1093/aesa/sav057>
- Kapil RP, Dhaliwal JS (1968) Defense of nest by the female of *Xylocopa fenestrata* Fab. (Xylocopinae, Hymenoptera). Insectes Sociaux 15:419–422. <https://doi.org/10.1007/BF02223639>
- Kapil RP, Grewl GS, Kumar S, Atwal AS (1971) Insect pollinators of rape seed and mustard. Indian Journal of Entomology 33:61–66.
- Kapil RP, Grewal GS, Kumar S, Atwal AS (1974) Insect pollinators of alfalfa, *Medicago sativa* L. Indian Journal of Entomology 36:214–220.
- Kapil RP, Chaudhary JP, Jain KL (1975) Biology and utilization of insect pollinators for crop production. SEC Annual Report, Department Zoology Haryana Agricultural University, Hissar.

- Kapil RP, Jain KL (1979) Management of megachilid bees for the pollination of alfalfa. In: Proceedings Pollination Ecology And Applied Palynology, Department of Zoology, Haryana Agricultural University, Hisar.
- Kremen C, Bugg RL, Nicola N, Smith SA, Thorp RW, Williams NM (2002) Native bees, native plants and crop pollination in California. *Fremontia* 30:41-49.
- Kristjansson K, Rasmussen K (1991) Pollination of sweet pepper (*Capsicum annuum* L.) with the solitary bee *Osmia cornifrons* (Rasoszkowski). *Acta Horticulturae* 288:173-177. <https://doi.org/10.17660/ActaHortic.1991.288.24>
- Krunic M, Stanisavljevic L, Brajkovic M, Tomanovic Z, Radovic I (2001) Ecological studies of *Osmia cornuta* (Latr.) (Hymenoptera, Megachilidae) populations in Yugoslavia with special attention to their diapause. *Acta Horticulturae* 561:297-301. <https://doi.org/10.17660/ActaHortic.2001.561.45>
- Kwon YJ, Saeed S (2003) Effect of temperature on the foraging activity of *Bombus terrestris* (Hymenoptera: Apidae) on greenhouse hot pepper (*Capsicum annuum*). *Applied Entomology and Zoology* 38:275-289. <https://doi.org/10.1303/aez.2003.275>
- Lye GC, Jennings SN, Osborne JL, Goulson D (2011) Impacts of the use of nonnative commercial bumble bees for pollinator supplementation in raspberry. *Journal of Economic Entomology* 104:107-114. <https://doi.org/10.1603/EC10092>
- Macfarlane RP, Royce LA, Wyatt BKW, Mayer DF (1994) Evaluation of commercial bumble bee colonies for cranberry pollination. *Melandria* 50:13-19.
- Mackenzie KE, Javorek S, Rogers D (1997) The alfalfa leafcutting bee, *Megachile rotundata* Fabr.: an alternative managed pollinator of lowbush blueberry. *Acta Horticulturae*: 446:87-90. <https://doi.org/10.17660/ActaHortic.1997.446.11>
- Mohammad A (1935) Pollination studies in toria (*Brassica napus* var *dichotomoa* Prain) and sarson (*Brassica campestris* var *sarson* Prain). *Indian Journal of Agricultural Science* 5:125-154.
- Morandin LA, Lavery TM, Kevan PG (2001) Bumble bee (Hymenoptera: Apidae) activity and pollination levels in commercial tomato greenhouses. *Journal of Economic Entomology* 94:462-467. <https://doi.org/10.1603/0022-0493-94.2.462>
- Nunes-Silva P, Hrcir M, Silva CI, Roldao Y, Imperatriz-Fonseca VL (2013) Stingless bees, *Melipona fasciculata*, as efficient pollinators of eggplant (*Solanum melongena*) in greenhouses. *Apidologie* 44:537-546. <https://doi.org/10.1007/s13592-013-0204-y>
- Oliveira R, Schlindwein C (2009) Searching for a manageable pollinator for acerola orchards: the solitary oil-collecting bee *Centris analis* (Hymenoptera: Apidae: Centridini). *Journal of Economic Entomology* 102:265-273. <https://doi.org/10.1603/029.102.0136>
- Palma G, Quezada-Euan JG, Reyes-Oregel V, Melendez V, Moo-Valle H (2008) Production of greenhouse tomatoes (*Lycopersicon esculentum*) using *Nannotrigona perilampoides*, *Bombus impatiens* and mechanical vibration (Hym.: Apoidea). *Journal of Applied Entomology* 132:79-85. <https://doi.org/10.1111/j.1439-0418.2007.01246.x>
- Parker FD (1985) A candidate legume pollinator, *Osmia sanrafaelae* Parker (Hymenoptera: Megachilidae). *Journal of Apicultural Research* 24:132-136. <https://doi.org/10.1080/00218839.1985.11100661>
- Parker FD, Tepedino VJ, Bohart GE (1981) Notes on the biology of a common sunflower bee, *Melissodes (Eumelissodes) agilis* Cresson. *Journal of the New York Entomological Society* 89:32-52.
- Peterson SS, Artz DR (2014) Production of solitary bees for pollination in the United States. In: Morales-Ramos JA, Guadalupe Rojas M, Shapiro-Ilan DI, editors. Mass production of beneficial organisms: Invertebrates and entomopathogens. London: Academic Press. <https://doi.org/10.1016/B978-0-12-391453-8.00019-4>
- Phillips K (2011) A comparison of bumblebees (*Bombus* spp.) and honey bees (*Apis mellifera*) for the pollination of Oregon cranberries (Ericaceae: *Vaccinium macrocarpon*). Tesis de Maestria. Oregon State University. Oregon, EEUU.
- Pinchinat B, Bilinski M, Ruszkowski A (1979) Possibilities of applying bumble bees as pollen vectors in tomato F1 hybrid seed production. *Proc. 4 Int. Symp. Poll.*: 73-90.

- Purves RG, Clifford PTP, Donovan BJ (1998) Preliminary observations of *Osmia coerulescens* as a pollinator of herbage seed crops. Proceedings of the New Zealand Grassland Association 60:161-164. <https://doi.org/10.33584/jnzc.1998.60.2316>
- Rader R, Howlett BG, Cunningham SA, Westcott DA, Newstrom-Lloyd L, Walker M, Teulon D, Edwards W (2009) Alternative pollinator taxa are equally efficient but not as effective as the honeybee in a mass flowering crop. Journal of Applied Ecology 46:1080-1087. <https://doi.org/10.1111/j.1365-2664.2009.01700.x>
- Rashad SE (1985) Utilization of non-Apis bees as crop pollinators. Final Report (Cairo: Cairo University) 144 pp.
- Read PEC, Donovan BJ, Griffin RP (1989) Use of bumble bees *Bombus terrestris*, as pollinators of kiwifruit and lucerne in New Zealand. New Zealand Entomologist 12:19-23. <https://doi.org/10.1080/00779962.1989.9722558>
- Richards KW, Meyers TW (1997) Commercially managed colonies of bumble bees and honey bees for production of cicer milkvetch. Acta Horticulturae 437:293-298. <https://doi.org/10.17660/ActaHortic.1997.437.35>
- Ruz L (2002) Bee pollinators introduced to Chile: a review. In: Kevan P., Imperatriz Fonseca V. (Eds.), Pollinating bees - the conservation link between agriculture and nature, Ministry of Environment Brasília.
- Saeed S, Sajjad A, Jung ky (2012) Bumble bees (*Bombus terrestris*) can be the efficient pollinators of cotton. Pakistan Entomologist 34:17-20.
- Schindler M, Peters B (2011) Mason bees *Osmia bicornis* and *Osmia cornuta* as suitable orchard pollinators? Erwerbs-Obstbau 52:111-116 <https://doi.org/10.1007/s10341-010-0118-z>
- Sheffield CS, Kevan PG, Westby SM, Smith RF (2008) Diversity of cavity-nesting bees (Hymenoptera: Apoidea) within apple orchards and wild habitats in the Annapolis Valley, Nova Scotia, Canada. The Canadian Entomologist 140:235-249. <https://doi.org/10.4039/n07-058>
- Slaa EJ, Sanchez LA, Sandi M, Salazar W (2000) A scientific note on the use of stingless bees for commercial pollination in enclosures. Apidologie 31:141-142. <https://doi.org/10.1051/apido:2000112>
- Slaa EJ, Chaves LAS, Malagodi-Braga KS, Hofstede FE (2006) Stingless bees in applied pollination: practice and perspectives. Apidologie 37:293-315. <https://doi.org/10.1051/apido:2006022>
- Strange JP (2015) *Bombus huntii*, *Bombus impatiens*, and *Bombus vosnesenkii* (Hymenoptera: Apidae) pollinate greenhouse-grown tomatoes in western North America. Journal of Economic Entomology 108:873-879. <https://doi.org/10.1093/jee/tov078>
- Stubbs CS, Drummond FA (1999) Pollination of Lowbush Blueberry by *Anthophora pilipes villosula* and *Bombus impatiens* (Hymenoptera: Anthophoridae and Apidae). Journal of the Kansas Entomological Society 72:330-333.
- Tasei JN (1972) Observations préliminaires sur la biologie d'*Osmia* (*Chalcosmia*) *coerulescens* L., (Hymenoptera Megachilidae), pollinisatrice de la luzerne (*Medicago sativa* L.). Apidologie 3:149-165. <https://doi.org/10.1051/apido:19720203>
- Torchio PF (1976) Use of *Osmia lignaria* Say (Hymenoptera: Apoidea, Megachilidae) as a pollinator in an apple and prune orchard. Journal of the Kansas Entomological Society 49:475-482.
- Torchio PF (1990) *Osmia ribifloris*, a native bee species developed as a commercially managed pollinator of highbush blueberry (Hymenoptera: Megachilidae). Journal of the Kansas Entomological Society 63(3):427-436.
- Udayakumar A, Chaubey BK, Shivalingaswamy TM (2021) *Amegilla violacea* (Lepelletier, 1841) (Anthophorini: Apidae)-A native bee, an effective pollinator of eggplant (*Solanum melongena*). Journal of Apicultural Research, 62:411-417. <https://doi.org/10.1080/00218839.2020.1862393>
- Valle O, Aaltonen M (1969) Domestication trials on bumblebees. Suom. Maatal. Seur. Julk. 113:5-21.

- Velthuis HHW, van Doorn A (2004) The breeding, conservation and economic value of bumblebees. In: Freitas B.M., Pereira J.O.P. (Eds.), Solitary bees: conservation, rearing and management of pollination, Ed. Universitaria, Fortaleza, Brasil.
- Vergara CH, Fonseca-Buendía P (2012) Pollination of greenhouse tomatoes by the Mexican bumblebee *Bombus ephippiatus* (Hymenoptera: Apidae). Journal of Pollination Ecology 7:27-30. [https://doi.org/10.26786/1920-7603\(2012\)1](https://doi.org/10.26786/1920-7603(2012)1)
- Vicens N, Bosch J (2000) Weather-dependent pollinator activity in an apple orchard, with special reference to *Osmia cornuta* and *Apis mellifera* (Hymenoptera: Megachilidae and Apidae). Environmental Entomology 29:413-420. <https://doi.org/10.1603/0046-225X-29.3.413>
- Watmough RH (1987) A leaf-cutter bee (Megachilidae) and a carpenter bee (Anthophoridae) as possible pollinators of Lucerne (*Medicago sativa* L.) in the Oudtshoorn district. South African Bee Journal 59:114.
- West TP, Mccutcheon TW (2009) Evaluating *Osmia cornifrons* as pollinators of highbush blueberry. International Journal of Fruit Science 9:115-125. <https://doi.org/10.1080/15538360902991303>
- Xu HL, Yang LI, Kwon YJ (1995) Current status on the utilization of *Osmia* bees as pollinators of fruit trees in China (Hymenoptera: Megachilidae). Korean Journal of Apiculture 10:111-116.
- Zisovich AH, Goldway M, Schneider D, Steinberg S, Stern E, Stern RA (2012) Adding bumblebees (*Bombus terrestris* L., Hymenoptera: Apidae) to pear orchards increases seed number per fruit, fruit set, fruit size and yield. The Journal of Horticultural Science and Biotechnology 87:353-359. <https://doi.org/10.1080/14620316.2012.11512876>