

## Supplemental Material

First report of gynandromorphy in *Hoplitis*: A bilateral specimen of *H. (Alcidamea) producta* (Hymenoptera: Megachilidae)

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**Table S1.** Updated list of wild bee gynandromorph records from reviews by Michez *et al.* (2009) (Src A) and Hinojosa Díaz *et al.* (2012) (Src B). Additional reports from 2012 to 2024, including some previously not mentioned, were compiled for this work (Src C).

Note A: Originally listed as *Xylocopa ordinaria* (Smith); see Lucia & González (2013).

Note B: Reported as possibly intersex.

Note C: Originally reported as *Melissodes hortivagans* Cockerell; see Campbell *et al.* (2024).

Note D: Specimens with subspecies names are analyzed at the species level for species counts.

Type	Reference	Src
<b>Andrenidae:</b>		
<i>Andrena barbilabris</i> (Kirby)	Wolf (1993b)	A
<i>Andrena bimaculata</i> (Kirby)	Perkins (1914)	A
<i>Andrena chengtshensis</i> Yasumatsu	Xu & Cui (2007)	B
<i>Andrena convexiuscula</i> Kirby	Schenk (1871)	A
<i>Andrena fasciata</i> Wesm.	Schenk (1871)	A
<i>Andrena flavipes</i> Panzer	Perkins (1914)	A
<i>Andrena fucata</i> Smith	Løken (1967)	A
<i>Andrena fulva</i> (Müller)	Wolf (1990)	A
<i>Andrena fulva</i> (Müller)	Wolf (1993a)	A
<i>Andrena fulva</i> (Müller)	Wolf (2005)	B
<i>Andrena haemorrhoa</i> (Fabricius)	Wolf (1989)	A
<i>Andrena helvola</i> (L.)	Celary & Wisniowski (2001)	A
<i>Andrena helvola</i> (L.)	Schenk (1871)	A
<i>Andrena humilis</i> Imhoff	Wolf (1994b)	A
<i>Andrena humilis</i> Imhoff	Wolf (1995b)	A
<i>Andrena porterae</i> Cockerell	Linsley (1937)	A
<i>Andrena potentillae</i> Panzer	Wolf (1982)	A
<i>Andrena praecox</i> (Scopoli)	Wolf (1998c)	A
<i>Andrena sp.</i>	Torres & Ramos (2000)	B
<i>Andrena wilkella</i> (Kirby)	Cederberg (2008)	B
<i>Acamptopoeum submetallicum</i> (Spinola)	Ramos & Ruz (2013). Note B	C
<i>Perdita moabensis</i> Timberlake	Portman & Griswold (2017)	C
<b>Apidae:</b>		
<i>Anthophora furcata</i> (Panzer)	Wolf (1995a)	A
<i>Anthophora plumipes</i> (Pallas)	Michez <i>et al.</i> (2009)	B
<i>Bombus fernaldae</i> (Franklin)	Milliron (1960)	A
<i>Bombus flavifrons</i> Cresson	Milliron (1962)	A
<i>Bombus lapidarius</i> (L.)	Sichel (1858)	A
<i>Bombus lapidarius</i> (L.)	Stöckhert (1920)	A
<i>Bombus monticola rondoui</i> Vogt.	Michez <i>et al.</i> (2009); Note D.	A
<i>Bombus pascuorum</i> (Scopoli)	Laidlaw (1932)	A

Type	Reference	Src
<i>Bombus pascuorum</i> (Scopoli)	Röseler (1962)	A
<i>Bombus pascuorum</i> (Scopoli)	Wolf (1993b)	A
<i>Bombus pratorum</i> (L.)	Wolf (1991b)	A
<i>Bombus ruderarius</i> Müller	Stöckhert (1924)	A
<i>Bombus vestalis sorgonis</i> (Strand)	Michez <i>et al.</i> (2009); Note D.	B
<i>Bombus vestalis vestalis</i> (Fourcroy)	Michez <i>et al.</i> (2009); Note D.	B
<i>Bombus wurflenii</i> Radoskowski	Ritsema (1881)	A
<i>Bombus wurflenii</i> Radoskowski	Stöckhert (1924)	A
<i>Epeolus julliani</i> Pérez	Wolf (2000)	A
<i>Euglossa iopoecila</i> Dressler	Giangarelli & Sofia (2011)	B
<i>Euglossa tridentata</i> Moure	Hinojosa Díaz <i>et al.</i> (2012)	B
<i>Melipona mondury</i> Smith	Oliveira & Andrade (2006a)	B
<i>Melipona mondury</i> Smith	Oliveira & Andrade (2006b)	B
<i>Nomada fucata</i> Panzer	Schenk (1871)	A
<i>Nomada laevilabris</i> Schmiedecknecht	Pérez-Iñigo Mora (1982)	A
<i>Nomada sp.</i>	Tsuneki (1975)	A
<i>Partamona cupira</i> Smith	Schwarz (1929)	A
<i>Thyreus redaluctus?</i> Cockerell	Engel (2007)	A
<i>Xylocopa brasilianorum</i> (L.)	Benoist & Berland (1935)	A
<i>Xylocopa confusa</i> Pérez	Handschin (1935)	A
<i>Xylocopa fenestrata</i> (Fabricius)	Maa (1940)	A
<i>Xylocopa mendozana</i> Enderlein	Enderlein (1913b)	A
<i>Xylocopa micans</i> Lepeletier	Maidl (1912)	A
<i>Xylocopa nigrita</i> (Fabricius)	Carcasson (1965)	A
<i>Xylocopa nigrocincta</i> Smith	Lucia <i>et al.</i> (2009)	B
<i>Xylocopa ordinaria</i> Smith	Enderlein (1913a)	A
<i>Alloscirtetica brethesi</i> (Joergensen)	Urban (1999)	C
<i>Bombus bimaculatus</i> Cresson	Spring <i>et al.</i> (2015)	C
<i>Bombus ignitus</i> Smith	Ugajin <i>et al.</i> (2016)	C
<i>Centris pallida</i> Fox	Barrett (2021)	C
<i>Ceratina dallatorreana</i> Friese	Daly (1966); (3 specimens; 1gr, 1blk, 1blk #2)	C
<i>Ceratina dallatorreana</i> Friese	Mikát & Straka (2023)	C
<i>Ceratina montana</i> Holmberg	Holmberg (1884)	C
<i>Ceratina rupestris</i> Holmberg	Lucia <i>et al.</i> (2012); (3 specimens; #1, #2, #3)	C
<i>Ceratina binghami binghami</i> Cockerell	Prashantha <i>et al.</i> (2018). Note D	C
<i>Epeolus flavofasciatus</i> Smith	Onuferko (2018)	C
<i>Epicharis iheringii</i> Friese	Alvarez <i>et al.</i> (2019)	C
<i>Eucera pruinosa</i> (Say)	Jones <i>et al.</i> (2021)	C
<i>Euglossa gorgonensis</i> Cheesman	González (2014)	C

Type	Reference	Src
<i>Euglossa melanotricha</i> Moure	Suzuki <i>et al.</i> (2015)	C
<i>Euglossa pleosticta</i> Dressler	Camargo & Gonçalves (2013)	C
<i>Eulaema atleticana</i> Nemésio	Silveira <i>et al.</i> (2012)	C
<i>Eulaema meriana</i> (Olivier)	Pazmiño-Palomino & de Oliveira (2021)	C
<i>Florilegus condignus</i> (Cresson)	Parys <i>et al.</i> (2022)	C
<i>Lophopedia nigrispinis</i> (Vachal)	Alvarez <i>et al.</i> (2019)	C
<i>Melipona flavolineata</i> Friese	Santos-Silva <i>et al.</i> (2024)	C
<i>Melissodes communis</i> Cresson	Campbell <i>et al.</i> (2024)	C
<i>Melissodes communis</i> Cresson	Cockerell (1906). Note C	C
<i>Melissodes trinodis</i> Robertson	Campbell <i>et al.</i> (2024); (2 specimens; GF, BC)	C
<i>Nomada flava</i> Panzer	Le Féon <i>et al.</i> (2016)	C
<i>Nomada lathburiana</i> (Kirby)	Le Féon <i>et al.</i> (2016)	C
<i>Paratrigona glabella</i> Camargo & Moure	Alvarez <i>et al.</i> (2014)	C
<i>Xylocopa atamisquensis</i> Lucia & Abrahamovich	Lucia & González (2013) recharacterization of Enderlein (1913). Note A.	C
<i>Xylocopa augusti</i> Lepeletier	Almada <i>et al.</i> (2022); (2 specimens; #1, #2)	C
<i>Xylocopa augusti</i> Lepeletier	Lucia <i>et al.</i> (2015)	C
<i>Xylocopa brasilianorum</i> (L.)	Almeida <i>et al.</i> (2018)	C
<i>Xylocopa darwini</i> Cockerell	Zama & Coelho (2017)	C
<i>Xylocopa frontalis</i> (Olivier)	Lucia & González (2013)	C
<i>Xylocopa frontalis</i> (Olivier)	Villamizar (2020)	C
<i>Xylocopa frontalis</i> (Olivier)	Vivallo (2015)	C
<i>Xylocopa nasalis</i> Westwood	Prashantha <i>et al.</i> (2018)	C
<i>Xylocopa ordinaria</i> Smith	Almeida <i>et al.</i> (2018)	C
<i>Xylocopa pubescens</i> Spinola	Guershon & Ionescu-Hirsch (2012)	C
<i>Xylocopa splendidula</i> Lepeletier	Lucia <i>et al.</i> (2012)	C
<i>Xylocopa varipuncta</i> Patton)	Zama & Coelho (2017)	C
<i>Xylocopa violacea</i> (L.)	Kriechbaumer (1872)	C
<i>Xylocopa virginica</i> (L.)	Milliron <i>et al.</i> (1958)	C
<b>Colletidae:</b>		
<i>Colletes cunicularius</i> (L.)	O'Toole (1989)	A
<i>Colletes hedinii</i> Kuhlmann	Ferrari <i>et al.</i> (2021)	C
<i>Euryglossa</i> sp.	Exley (1976)	A
<i>Hylaeus albofasciata</i> Friese	Stöckhert (1924)	A
<i>Hylaeus brevicornis</i> Nylander	Morice (1915)	A
<i>Hylaeus hyalinatus</i> Smith	Schoder (2018)	C
<i>Hylaeus intermedius</i> Förster	Schoder & Zettel (2017)	C
<i>Hylaeus minuta</i> (Fabricius)	Noskiewicz (1923)	A
<i>Hylaeus modestus</i> Say	Lightburn <i>et al.</i> (2022)	C

Type	Reference	Src
<i>Hylaeus punctulatissimus</i> Smith	Rolke (2020)	C
<i>Hylaeus rudbeckiae</i> (Cockerell & Casad)	Oram (2022)	C
<b>Halictidae:</b>		
<i>Augochlora amphitrite</i> (Schrottky)	Alvarez <i>et al.</i> (2014)	C
<i>Halictus quadricinctus</i> (Fabricius)	Saunders (1901)	A
<i>Halictus sexcinctus</i> (Fabricius)	Leclercq (1953)	A
<i>Halictus tumulorum</i> (L.)	Andrewes (1946)	A
<i>Halictus tumulorum</i> (L.)	Hohndorf (1931)	A
<i>Halictus tumulorum</i> (L.)	Wolf (1995a)	A
<i>Lasioglossum albipes</i> (Fabricius)	Nilsson (1987)	A
<i>Lasioglossum calceatum</i> (Scopoli)	Plateau-Quénu (1982)	A
<i>Lasioglossum calceatum</i> (Scopoli)	Wolf (1990b)	B
<i>Lasioglossum eurygnathus</i> Bluthgen	Popov (1937)	A
<i>Lasioglossum fulvicorne</i> (Kirby)	Wolf (1987a)	A
<i>Lasioglossum lativentre</i> (Schenck)	Stöckhert (1924)	A
<i>Lasioglossum lissonotum</i> (Noskiewicz)	Wolf (1990)	A
<i>Lasioglossum malachurum</i> (Kirby)	Stöckhert (1924)	A
<i>Lasioglossum morio</i> (Fabricius)	Arp (2020)	C
<i>Lasioglossum morio</i> (Fabricius)	Wolf (1986)	A
<i>Lasioglossum morio</i> (Fabricius)	Wolf (1997b); (2 specimens: #1, #2)	B
<i>Lasioglossum pauxillum</i> (Schenck)	Wolf (2003b)	B
<i>Megalopta amoena</i> (Spinola)	Krichilsky <i>et al.</i> (2020)	C
<i>Nomioides minutissimus</i> (Rossi)	Wolf (1997a)	A
<i>Sphecodes albilabris</i> (Fabricius)	Wolf (1994a)	A
<i>Sphecode geofrellus</i> (Kirby)	Wolf (1987b)	A
<i>Sphecodes gibbus</i> (Linnaeus)	Nieuwenhuijsen (2000)	B
<i>Sphecodes gibbus</i> (Linnaeus)	Wolf (2003c)	B
<i>Sphecodes niger</i> Hagens	Wolf (1991b)	A
<i>Sphecodes pellucidus</i> Smith	Wolf (1997b)	B
<i>Sphecodes reticulatus</i> Thomson	Stöckhert (1924)	A
<i>Sphecodes rufiventris</i> (Panzer)	Wolf (1987b)	A
<i>Thectochlora alaris</i> (Vachal)	Engel & Hinojosa-Díaz (2011)	B
<b>Megachilidae:</b>		
<i>Anthidiellum strigatum</i> (Panzer)	Wolf (2003a)	B
<i>Anthidium loti</i> Perris	Wolf (2006)	B
<i>Anthidium oblongatum</i> Latreille	Stöckhert (1924)	A
<i>Anthidium strigatum</i> (Panzer)	Wolf (1998a)	A
<i>Chalicodoma parietina</i> (Geoffroy)	Bischoff & Ulrich (1929)	A

Type	Reference	Src
<i>Coelioxys inermis</i> (Kirby)	Wolf (1999)	A
<i>Coelioxys rufescens</i> Lepeletier	Noskiewicz (1923)	A
<i>Dianthidium pudicum</i> (Cresson)	Mullins <i>et al.</i> (2024)	C
<i>Dianthidium sayi</i> Cockerell	Hicks (1926)	A
<i>Dianthidium ulkei</i> (Cresson)	Schwarz (1926)	A
<i>Heriades carinata</i> Cresson	Mullins <i>et al.</i> (2024)	C
<i>Hoplitis producta</i> (Cresson)	This work	C
<i>Megachile albisecta</i> (Klug)	Maharramov <i>et al.</i> (2021)	C
<i>Megachile angularum</i> Cockerell	Mitchell (1941)	A
<i>Megachile bertonii</i> Schrottky	Mitchell (1929)	A
<i>Megachile cf. leachella</i> Curtis	Wolf (1998d)	A
<i>Megachile chapadiana</i> Mitchell	Mitchell (1929)	A
<i>Megachile chrysopidia</i> Smith	Rayment (1935)	A
<i>Megachile curvipes</i> Smith	Mitchell (1941)	A
<i>Megachile deceptoria</i> Perez	Fateryga <i>et al.</i> (2011)	C
<i>Megachile deserta</i> Cockerell	Cockerell (1911)	A
<i>Megachile gathela</i> Cameron	Gupta (2004)	B
<i>Megachile gemula</i> Cresson	Mitchell (1929)	A
<i>Megachile latimanus</i> Say	Mitchell (1932)	A
<i>Megachile maritima</i> (Kirby)	Wolf (1993a)	A
<i>Megachile melanophaea</i> Smith	Vizza <i>et al.</i> (2021)	C
<i>Megachile montezuma</i> Cresson	Gonzalez (2004)	B
<i>Megachile onobrychidis</i> Cockerell	Mitchell (1941)	A
<i>Megachile otomita</i> Cresson	Hinojosa Díaz <i>et al.</i> (2012)	B
<i>Megachile parallela</i> Smith	Mitchell (1929)	A
<i>Megachile parallela</i> Smith	Mitchell (1941)	A
<i>Megachile perihirta</i> Cockerell	Mitchell (1929)	A
<i>Megachile picicornis</i> Morawitz	Fateryga <i>et al.</i> (2011); (6 specimens; 1–6)	C
<i>Megachile pilidens</i> Alfken	Sommaggio <i>et al.</i> (2021)	C
<i>Megachile pilidens</i> Alken	Wolf (1998b)	A
<i>Megachile pilidens</i> Alfken	Wolf (2004)	B
<i>Megachile rotundata</i> (Fabricius)	Akre <i>et al.</i> (1982); (2 specimens; #1, #2)	A
<i>Megachile rotundata</i> (Fabricius)	Gerber & Akre (1969)	A
<i>Megachile rubricata</i> Smith	Coelho <i>et al.</i> (2016)	C
<i>Megachile sculpturalis</i> Smith	Ferreira (2021)	C
<i>Megachile sp.</i>	Mitchell (1929)	A
<i>Megachile subrixactor</i> Cockerell	Cockerell (1918)	A
<i>Megachile tapytensis</i> Mitchell	Mitchell (1929)	A
<i>Megachile uniformis</i> Mitchell	Mitchell (1929)	A

Type	Reference	Src
<i>Megachile vidua</i> Smith	Mitchell (1929); (2 specimens; Intersex #1, Intersex #2)	A
<i>Megachile willughbiella</i> (Kirby)	Benno (1948)	A
<i>Megachile willughbiella</i> (Kirby)	Stenton (1909)	A
<i>Megachile willughbiella</i> (Kirby)	Wolf (1990b)	B
<i>Osmia aurulenta</i> (Panzer)	Wolf (1991a)	A
<i>Osmia aurulenta</i> (Panzer)	Wolf (2003d)	B
<i>Osmia bicolor</i> (Schrank)	Wolf (1990)	A
<i>Osmia caerulescens</i> (L.)	Benno (1948)	A
<i>Osmia caerulescens</i> (L.)	Nieuwenhuijsen (1995)	B
<i>Osmia caerulescens</i> (L.)	Torres & Ramos (2000); (2 specimens; Caso 1, Caso 2)	B
<i>Osmia obtusa</i> Friese	Wolf (2003a)	B
<i>Osmia pentstemonis</i> Cockerell	Sandhouse (1923)	A
<i>Osmia ribifloris biedermannii</i> (Michener)	Sampson <i>et al.</i> (2011); Note D	B
<i>Osmia rufa</i> (L.)	Barendrecht (1943)	B
<i>Osmia rufa</i> (L.)	Noskiewicz (1923)	A
<i>Osmia submicans</i> Morawitz	Kratochwil (2021)	C
<i>Rhodanthidium infuscatum</i> (Erichson)	Smit (2003)	B
<i>Trachusa byssina</i> (Panzer)	Wolf (1992)	A
<b>Melittidae:</b>		
<i>Dasypoda hirtipes</i> (Fabricius)	Michez <i>et al.</i> (2009)	A
<i>Dasypoda hirtipes</i> (Fabricius)	Wolf (1995a)	A
<i>Macropis europaea</i> Warncke	Wolf (2007)	B
<i>Melitta haemorrhoidalis</i> (Fabricius)	Michez <i>et al.</i> (2009)	A
<i>Melitta haemorrhoidalis</i> (Fabricius)	Wolf (1985)	A

**Figures S1–S2.** *Hoplitis producta* visiting *Prunella vulgaris* L. (Lamiaceae) at Cooper Mountain Nature Park. **S1.** Female **S2.** Male





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