

New records of megachilid bees (Hymenoptera: Megachilidae) for Colombia

Nuevos registros de abejas megachilidas (Hymenoptera: Megachilidae) para Colombia

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Abstract

The bee family Megachilidae consists of solitary species, some of which are important pollinators of cultivated plants. Although literature records indicate the existence of about 50 species of 10 genera of megachilid bees in Colombia, taxonomic studies are lacking and thus limited information is available on their identity as well as their distribution in the country. Herein, we provide new geographical records for the following ten species: *Anthidium sanguinicaudum* Schwarz, *Chelostomoides otomita* (Cresson), *Hoplostelis bilineolata* (Spinola), *Megachile amparo* Gonzalez, *M. kalina* Gonzalez et al., *M. lorensiensis* Mitchell, *M. moderata* Smith, *M. simillima* Smith, *Pseudomegachile lanata* (Fabricius), and *Stelis costaricensis* Friese. We report *M. kalina* for the first time for the country.

Resumen

Las abejas de la familia Megachilidae son especies solitarias, algunas de ellas importantes polinizadores de cultivos. Aunque en la literatura se registran cerca de 50 especies de 10 géneros de abejas megachilidas en Colombia, faltan estudios taxonómicos y, por lo tanto, se dispone de información limitada sobre la identidad y la distribución de este grupo en el país. En este trabajo proporcionamos nuevos registros geográficos para 10 especies poco conocidas [*Anthidium sanguinicaudum* Schwarz, *Chelostomoides otomita* (Cresson), *Hoplostelis bilineolata* (Spinola), *Megachile amparo* Gonzalez, *M. kalina* Gonzalez et al., *M. lorensiensis* Mitchell, *M. moderata* Smith, *M. simillima* Smith, *Pseudomegachile lanata* (Fabricius), y *Stelis costaricensis* Friese]. *Megachile kalina* se registra por primera vez para Colombia.

Keywords:

Leaf-cutter bees, wool carder bees, Anthidiini, Megachilini, Apoidea.

Palabras clave:

Abejas cortadoras de hojas, abejas cardadoras de lana, Anthidiini, Megachilini, Apoidea.

Introduction

Megachilidae is one of the five bee families currently known in Colombia (Gonzalez & Engel 2004, Smith-Pardo 2003, Ascher & Pickering 2019). It consists of solitary species that nest in pre-existing cavities in the ground, stems, twigs, and artificial substrates. Bees of this family use diverse nesting materials to build their nests, including pebbles, leaves (masticated or in pieces), plant hairs, petals, and mud. The family is cosmopolitan in distribution and contains a similar number of described species to that of Halictidae (Michener 2007, Gonzalez et al. 2012a, b). Some megachilid species are invasive in many areas of the world while others are efficient pollinators, such as *Megachile rotundata* (Fabricius), which is used in alfalfa pollination.

Megachilidae is the third richest bee family in Colombia. Literature records indicate the existence of about 600 species of bees in the country, of which 50 of them (10 genera and 3 tribes) are Megachilidae, about half the number species of halictid bees recorded for Colombia (e.g., Smith-Pardo 2003, Ascher & Pickering 2019). However, most taxonomic studies in the country are on a few groups of bees in the most species-rich family, Apidae, namely stingless bees (Meliponini), bumble bees (Bombini), and orchid bees (Euglossini) (e.g., Lievano et al. 1991, Bonilla-Gómez & Nates-Parra 1992, Ospina-Torres 1998, Nates-Parra 2005, Nates-Parra & Rosso-Londoño 2013). To date, a good number of taxa in these groups can be identified at the species level and published information exists on their distribution. However, all together these groups of bees represent only about one-third of the total number of species in the country. Thus, we know little to almost nothing about the remaining two-thirds of Colombian's bees.

The current species number of megachilids in Colombia does not represent its true richness. For example, in the most intensive bee inventory conducted until today in any ecosystem in Colombia, Smith-Pardo and Gonzalez (2007) recorded 287 species of which 35 of them were Megachilidae. That is about 70% of the number of megachilid species recorded for the entire country. Given that Smith-Pardo and Gonzalez (2007) surveyed bees in lowland tropical rain forests of Porce, Antioquia, the richness of Megachilidae is expected to be much higher when other ecosystems, such as dry tropical forests, are thoroughly surveyed. In addition, recent studies on this family have yielded several new species (e.g., Gonzalez et al. 2012a, b, Gonzalez et al. 2018), as well as new records that significantly extended the distribution of some taxa in the Americas. For example, the discovery of *Heriades tayrona* in northern Colombia extended the distribution of the tribe Osmiini for South America (Gonzalez & Griswold 2011).

Considering the limited information on Colombian megachilid bees, the purpose of this contribution is to make available new geographical records for some little-known Colombian species.

Material and methods

We followed the classification of Michener (2007) for Anthidiini and that of Gonzalez et al. (2019) for Megachilini. To map the distribution of each species, we used the geographical coordinates associated with specimen labels and, for records that did not have exact geographical information, we used Google Earth (Google, Mountain View, CA, USA) to acquire their coordinates. We generated maps using SimpleMappr (Shorhouse 2010). For each species, we complemented its distribution by searching in GBIF (www.gbif.org) and SpeciesLink (www.specieslink.net). We reproduced label data as appearing on the labels attached to the same specimen. We separated information on different labels by a single slash (/) and indicated annotations to clarify information in square brackets. To avoid repetition

of label data, we used “*ut supra*” (as above) to indicate the same information in the preceding label. We used the following institutional acronyms for repositories holding specimens studied:

ICN: Instituto de Ciencias Naturales Zoología, Bogotá, D.C., Colombia (F. Fernández).

LABUN: Laboratorio de Investigación en abejas de la Universidad Nacional Bogotá, D.C., Colombia (R. Ospina).

MPUJ: Museo Javeriano de Historia Natural Lorenzo Uribe, S.J., Universidad Javeriana, Bogotá, D. C., Colombia (D. Forero).

SEMC: Division of Entomology (Snow Entomological Collection), University of Kansas Natural History Museum, Lawrence, Kansas, USA (M.S. Engel, Z. Falin).

UNAB: Museo Entomológico, Universidad Nacional Agronomía Bogotá, Colombia (F. Serna).

Results

ANTHIDIINI
(Fig. 1)

GENUS *ANTHIDIUM* FABRICIUS

1. *Anthidium sanguinicaudum* Schwarz

Anthidium sanguinicaudum Schwarz, 1933:624 [♂]

Material examined ($n = 8♀, 4♂$). COLOMBIA: **Antioquia:** 2♀, Envigado, en techo de caña brava, Finca Emilio Restrepo). **Bolivar:** 1♀, Barú, en ventana, 31 Dic 2003; 1♀, Zambrano, Hacienda Monterrey, 9°45' N 74° 49'W, 10m [msnm] 11-10-93 [11 Oct. 1993]; 1♂, Zambrano, Hacienda Monterrey, Arroyo Bongal, 235 msnm, 16 Dic 1994. **Boyacá:** 1♀, (Casanare), Aguaclara, Hda. [hacienda] Dn. [don] Antonio, 600m [msnm], 15–20 Mar. **Huila:** 1♂, El Hobo, 12 V 1998 [12 May. 1998]. **Magdalena:** 1♂, Taganga, Monoguaca, 0m [msnm], 12-IX-06 [12 Sep 2006]. **Tolima:** 3♀, 1♂, Coelho, Reserva El Neme, 4.2828010° N 74.90350° W, 328m [msnm], 9–13 mar 2015. **Valle del Cauca:** 1♂, El Dovio, Vereda Bellavista, 1750msnm, 8-15-2002 [15 Agu. 2002].

Comments. *Anthidium* Fabricius contains more than 160 species worldwide. Gonzalez and Griswold (2013) revised the fauna of the Western Hemisphere and recognized 92 species, including the two adventive taxa, *A. oblongatum* (Illiger) and *A. manicatum* (Linnaeus). Species of *Anthidium* occur from Alaska to Argentina, from sea level to more than 4000 m in the Andes, mainly in xeric regions. In Colombia, Gonzalez and Griswold (2013) recorded a single species, *A. sanguinicaudum*. These authors considered *A. loboguerrero* Urban from Valle del Cauca, Colombia, as a color variant of *A. sanguinicaudum*. These new records expand the distribution of this species from its previously known range: Colombia: Valle del Cauca, Antioquia, Huila; Venezuela; Suriname (Gonzalez & Griswold 2013).



Figure 1. Map showing the collecting localities of Anthidiini in Colombia.

GENUS *HOPLOSTELIS* DOMINIQUE

2. *Hoplostelis (Hoplostelis) bilineolata* (Spinola)

Anthidium bilineolatum Spinola (1841: 141 [♂])

Material examined ($n = 8♀, 3♂$). COLOMBIA: **Boyaca:** 4♀, 1♂, Buenavista, vereda La Herradura, 5°28'31" 74°00'37" W, 879 msnm, 05-01-2014 [05 Jan. 2014]. **Cundinamarca:** 1♂, Anolaima, 4°45'51" N 74°28'08" W, 1650m n[msnm], 15 May. 2005; 1♂, Arbelaez, 1300m [msnm], 28 ene. 1999. **Santander:** 2♀, Floridablanca, casino, Finca Las Brisas, 1160m [msnm], col: G. Nates & A. Parra / 18147, 48 / LABUN005538, 39; 1♀ Cimitarra, Hacienda El Paraiso, 6°44'9" N 7428'2" W, 26 Apr. 2016.

Comments. This new record expands the distribution of this species from its previously known range: Bolivia; Brazil; Colombia: Magdalena, Valle del Cauca; Guiana; Guyana (Urban & Moure 2012, Ascher & Pickering 2019).

GENUS *STELIS* PANZER

3. *Stelis (Dolichostelis) costaricensis* Friese

Stelis (Protostelis) costaricensis Friese (1921:36 [♀, ♂])

Material examined ($n = 1♀, 3♂$). COLOMBIA: **Cundinamarca:** 1♂, Anolaima, vereda Santa Barbara, 07-16-2016 [16 Jul. 2016] [without label data] (LABUN); 1♂, Arbelaez, hacienda Paramillo, 31 V 80 [31 May. 1980]; 1♀, 1♂ Pacho, 11 III 78 [11 Mar 1978].

Comments. This new record expands the distribution of this species from its previously known range: Colombia: Valle del Cauca; Costa Rica; Guatemala; Honduras; Mexico (Gonzalez et al. 2012, Urban & Moure 2012).

MEGACHILINI

(Fig. 2)

GENUS *CHELOSTOMOIDES* ROBERTSON

4. *Chelostomoides otomita* (Cresson)

Chalicodoma (Chelostomoides) Cresson (1778:123 [♂])

Material examined ($n = 1♂$). COLOMBIA: **Magdalena:** 1♂, Taganga, 16 Jan. 2015.

Comments. This new record expands the distribution of this species from its previously known range: Belize; Colombia: Antioquia, Valle del Cauca; Costa Rica; El Salvador; Guatemala; Honduras; Mexico; Nicaragua (Urban & Moure 2012, Ascher & Pickering 2019).

GENUS *MEGACHILE* LATREILLE*MEGACHILE* (*CRESSONIELLA*) MITCHELL5. *Megachile* (*Cressoniella*) *amparo* Gonzalez*Megachile* (*Cressoniella*) *amparo* Gonzalez (2006:95 [♀, ♂])

Material examined ($n = 14♀, 11♂$). COLOMBIA: **Boyacá:** 1♀, Sogamoso, Rio Chiquito, 24 IV 2015 [24 Apr. 2015]; 1♂, Tunja, Santuario de Iguaque, Carrizal, 11 Jan. 1990; 1♂, *ut supra*, 2890msnm, 10 Jan. 1992; 1♀, *ut supra*, Esterillal, 3000msnm, 15 Jan. 1991; 1♂, *ut supra*, Q. La Laguna [Quebrada La Laguna], 13 Oct. 1990; 3♂, *ut supra*, 2750msnm, 5 Agu. 1990. **Cundinamarca:** 1♀, Bogotá, V 28 1985 [28 May. 1985]; 1♀, *ut supra*, 2600m [msnm], Oct. 2001; 1♂, Bogotá, Cerros de la Conejera, N 4°48'30.37" W 74°04'17.97, 2639m [msnm]; 1♂, *ut supra*, 18 sep. 2019; 1♀, *ut supra*, Facatativa, 21 VI 84 [21 jun. 1984]; 1♀, *ut supra*, Jardín Botánico, 7 Jun 2013; 1♀, *ut supra*, May. 2015; 1♂, *ut supra*, ago. 1999; 1♀, *ut supra*, Kennedy, Timiza, 4 Jan. 1984; 1♀, *ut supra*, 11 May. 1984; 1♀, *ut supra*, Universidad Nacional de Colombia, 2600 m, 23 II 2018 [23 Feb. 2018]; 1♀, *ut supra*, Biología [Departamento de Biología], 24 11 05 [24 Nov. 2005]; 1♀, *ut supra*, Jardín interior, 2650m [msnm], 23 II 06 [23 Feb. 2006]; 1♂, *ut supra*, Laboratorio de melisopalinología, 2 Sep. 2010; 1♀, *ut supra*, parqueadero de enfermería, 2540msnm, 23 II 01 [23 Feb. 2001]; 1♂, *ut supra*, Parque Nacional Olaya Herrera, N 4° 37'26" W 74°03'51", 26 08 2013 [26 Agu. 2013], 2600msnm; Choachí, La Chorrera, 2668msnm, 8 Oct. 2017; 2♀, Cota, apiario Moncaleano, en "tallos", 25 IV 77 [25 Apr. 1977]; 1♀, La Calera, Vereda San José del Triunfo, finca Ananse, 2783 m[msnm], 22 V 05 [22 May. 2005].

Comments. This species is commonly found on both rural and urban areas along Bogotá's high plain (Gonzalez 2006). The species is polylectic and presumably active year round. Rodriguez-C et al. (2021) studied the pollen from brood cells of a population established at the Jardín Botánico de Bogotá José Celestino Mutis in the city of Bogotá. These authors found pollen of *Monnina* sp. [Polygalaceae], *Tropaeolum majus* [Tropaeolaceae], and in less frequency pollen from Asteraceae, Maelastomataceae, and Passifloraceae. *Megachile amparo* has also been observed collecting pollen from *Lupinus* sp. (Fabaceae) and *Taraxacum officinale* (Asteraceae) (DA. Guevara Personal obs.).

MEGACHILE (*LEPTORACHINA*) MITCHELL6. *Megachile* (*Leptorachina*) *lorenziensis* Mitchell*Megachile* (*Leptorachina*) *lorenziensis* Mitchell (1930:124 [♀])

Material examined ($n = 4♀, 1♂$). COLOMBIA: **Antioquia:** 2♀, Porce, Rio Porce, 1000m. X-2-1976 [2 Oct. 1976]; **Valle del Cauca:** 2♀, El Dovio, Vereda Bellavista, 1750msnm, 7-26-2002 [26 Jul. 2002]; **Valle del Cauca:** 1♂, 10 Km. Cali, 1400m. IX 19 76 [19 Sep. 1976].

Comments. This new record expands the distribution of this species from its previously known range in Magdalena, Colombia (Mitchell 1930).

MEGACHILE (*RHYSSOMEGACHILE*) MITCHELL7. *Megachile* (*Rhysosomegachile*) *simillima* Smith*Megachile simillima* Smith, 1853:185 [♀]

Material examined ($n = 2♀$). Colombia: **Vaupés:** 2♀, Mitú, San Antonio, 300 msnm, 0°40'48.6" N 70°26'9.1" W, 11-18-2010 [18 Nov. 2010].

Comments. This new record expands the distribution of this species from its previously known range: Argentina; Bolivia; Brazil; Colombia: Amazonas; Ecuador; Venezuela (Gonzalez et al. 2018).

MEGACHILE (*ZONOMEGACHILE*) MITCHELL8. *Megachile* (*Zonomegachile*) *kalina* Gonzalez, Griswold and Engel*Megachile* (*Zonomegachile*) *kalina* Gonzalez, Griswold and Engel, 2018:43 [♂]

Material examined ($n = 1♀$). Colombia: **Vichada:** 1♀, Gaviotas [Las Gaviotas], 18-v-85 [18 May. 1985].

Comments. This new record expands the distribution of this species from its previously known range: French Guiana (Gonzalez et al. 2018).

9. *Megachile* (*Zonomegachile*) *moderata* Smith*Megachile* (*Zonomegachile*) *moderata* Smith (1879:74 [♀])

Material examined ($n = 2♀, 3♂$). Colombia: **Amazonas:** 1♀, Mirití, P. Rastrojo, 22 VII 84 [22 ago. 1984]. **Meta:** 1♂, La Macarena, Las Dantas, 580m [msnm], XII 86 [dic. 1986]; 2♂, Puerto Rico, Vereda Caños Alfa, 30 I 85 [30 Jan. 1985]. **Vaupés:** 1♀, Mitú, Puerto Nariño, 300 msnm, 0°35'44.3" N 70°22'41.2" W, 11-20-2010 [20 nov. 2010].

Comments. This new record expands the distribution of this species from its previously known range: Bolivia; Brazil; Colombia: Amazonas; Ecuador; French Guiana; Peru (Gonzalez et al. 2018).

GENUS *PSEUDOMEGACHILE* FRIESE10. *Pseudomegachile lanata* (Fabricius)*Apis lanata* Fabricius (1775:109 [♀])

Material examined ($n = 3♂$). Colombia: **Cesar:** Valledupar, Badillo, Rio Mojaculo, 10.623358, -73.127829, 179 msnm, 12 Apr. 2022. **Meta:** 1♂, Puerto López, finca la Libertad, Corpoica, N 4°05' W 72° 57', 365 m alt [msnm].

Comments. Gonzalez et al. (2019b) reported this adventive Indian species from the same locality in Meta, but from a specimen collected in 2015. The specimen recorded here was collected on 2011, thus suggesting an earlier establishment of this species in the region.



Figure 2. Map showing the collecting localities of Megachilini in Colombia.

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