

Journal of Melittology

Bee Biology, Ecology, Evolution, & Systematics

The latest buzz in bee biology

No. 34, pp. 1–9

29 May 2014

Revision of the bee genus *Chlerogella* (Hymenoptera: Halictidae), Part IV: A new species from southwestern Colombia

Michael S. Engel¹, Victor H. Gonzalez¹, & Ismael A. Hinojosa-Díaz²

Abstract. A new species of the diverse augochlorine bee genus *Chlerogella* Michener (Halictinae: Augochlorini) is described and figured from southwestern Colombia. *Chlerogella anchicaya* Engel, Gonzalez, & Hinojosa-Díaz, new species, is similar to *C. agaylei* Engel and *C. materdonnae* Engel, both occurring on the eastern slopes of the Andes in Ecuador. There are also some similarities with *C. eumorpha* Engel from the western Andean foothills in northern Ecuador, but differences in rostral length and male terminalia can distinguish these species. Revised couplets are provided to the South American species of *Chlerogella* to permit identification of the new species.

INTRODUCTION

One of the most vital and fundamental contributions toward a comprehensive understanding of any group of organisms is a revision and hypothesis as to the circumscription of its constituent species. Upon such a foundation are built our edifices of knowledge on everything from natural history, relationships, biogeography, ecology, and genetics. There is a long tradition of such revisions and species-level phylogenies among bees and such work is continually growing in interest and importance (Engel, 2011; Gonzalez *et al.*, 2013), although it is understandable that many groups remain to be investigated in a modern context. Remarkably, for the bee tribe Augochlorini a number of genera have been revised, particularly during the last 20 years, and keys to the species provided – these include *Paroxystoglossa* Moure (Moure, 1960), *Ctenaugochlora* Eickwort (Engel, 1995a; Engel & Gonçalves, 2010), *Rhectomia* Moure *s.l.* (Engel, 1995b; Gonçalves, 2010b), *Chlerogelloides* Engel *et al.* (Engel *et al.*, 1997; Engel &

¹ Division of Entomology, Natural History Museum, and Department of Ecology & Evolutionary Biology, 1501 Crestline Drive – Suite 140, University of Kansas, Lawrence, Kansas 66045, USA (msengel@ku.edu; victorgonzab@gmail.com).

² Department of Environmental Studies, Math and Science Center, 400 Dowman Drive, Emory University, Atlanta, Georgia 30322, USA (hinojosadiaz@gmail.com).

Table 1. Colombian species of *Chlerogella* Michener with the total known number of specimens (across the entire range of each species), elevational range, and collecting localities in Colombia (based on Engel, 2010b).

Species	Sex	Elevation (m)	Peruvian Localities
<i>C. anchicaya</i> , n. sp.	1♂	730	Valle del Cauca
<i>C. cyranoi</i> Engel	1♂	—	Porce, Antioquia
<i>C. hypermeces</i> Engel	9♂♂, 9♀♀	400–1100	Putumayo
<i>C. picketti</i> Engel	1♂	40	Nariño, Barbacoas
<i>C. terpsichore</i> Engel	5♂♂, 4♀♀	40	Nariño, Barbacoas
<i>C. tychoi</i> Engel	1♀	560	Valle del Cauca

Brooks, 1999b; Oliveira *et al.*, 2012), *Xenochlora* Engel *et al.* (Engel *et al.*, 1997), *Megaloptidia* Cockerell (Engel & Brooks, 1998), *Megaloptilla* Moure & Hurd (Engel & Brooks, 1999a), *Chlerogas* Vachal (Brooks & Engel, 1999; Engel *et al.*, 2006; Engel & Gonzalez, 2009; Engel, 2009a, 2010a), *Ischnomelissa* Engel (Engel, 1997, 2013a; Brooks & Engel, 1998; Engel & Brooks, 2002), *Micrommation* Moure (Smith-Pardo & Engel, 2004), *Augochlorella* Sandhouse (Coelho, 2004), *Thectochlora* Moure (Gonçalves & Melo, 2006), *Rhynchochlora* Engel (Engel, 2007), *Chlerogella* Michener (Engel, 2009b, 2010b; Engel & Rasmussen, 2013), *Halictillus* Moure (Gonçalves, 2010a), *Ceratalictus* Moure (Coelho & Gonçalves, 2010), *Megommation* Moure (Gonçalves & Santos, 2010), *Rhinocorynura* Schrottky (Gonçalves & Melo, 2012), and *Cleptommaton* Engel *et al.* (Engel, 2013b). In addition, several regional revisions have been completed for *Neocorynura* Schrottky (Smith-Pardo, 2005a, 2005b, 2010; Smith-Pardo & Gonzalez, 2009; Engel & Smith-Pardo, 2012), *Pseudaugochlora* Michener (Almeida, 2008), *Megalopta* Smith (Santos & Silveira, 2009; Gonzalez *et al.*, 2010), *Caenaugochlora* Michener (Gonçalves & Engel, 2010; Engel, 2014), and *Augochlora* Smith (Dalmazzo & Roig-Alsina, 2011). It is fair to say that the systematics of these bees has undergone a true revival and it is hoped that this momentum shall be maintained for decades to come.

Herein we provide a fourth installment to the earlier revision of *Chlerogella* (Engel, 2009b, 2010b), and its supplement (Engel & Rasmussen, 2013). The present account documents a further new species from the Andes of Colombia (Fig. 1), and provides modifications to existing keys that will permit its recognition from close congeners. This is the sixth species hitherto recorded from Colombia (Table 1), and it is likely that several more exist within undisturbed forests in the mountains of the Andes.

MATERIAL AND METHODS

The holotype of the new species discussed herein is deposited in the Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, Colombia (UNCB), and was compared with other species of *Chlerogella* deposited in the Division of Entomology, University of Kansas Natural History Museum, Lawrence, USA. Morphological terminology follows that of Eickwort (1969), Engel (2001, 2009b), and Michener (2007), while the format for the description follows that of Engel (2003a, 2003b, 2009b, 2010b) and Engel & Rasmussen (2013). Measurements were prepared with an ocular micrometer on an Olympus SZX-12 stereomicroscope and photographs prepared with a Canon EOS 7D digital camera attached to an Infinity K-2 long-distance microscope lens.



Figure 1. Photomicrograph of holotype male of *Chlerogella anchicaya*, new species.

SYSTEMATICS

Genus *Chlerogella* Michener

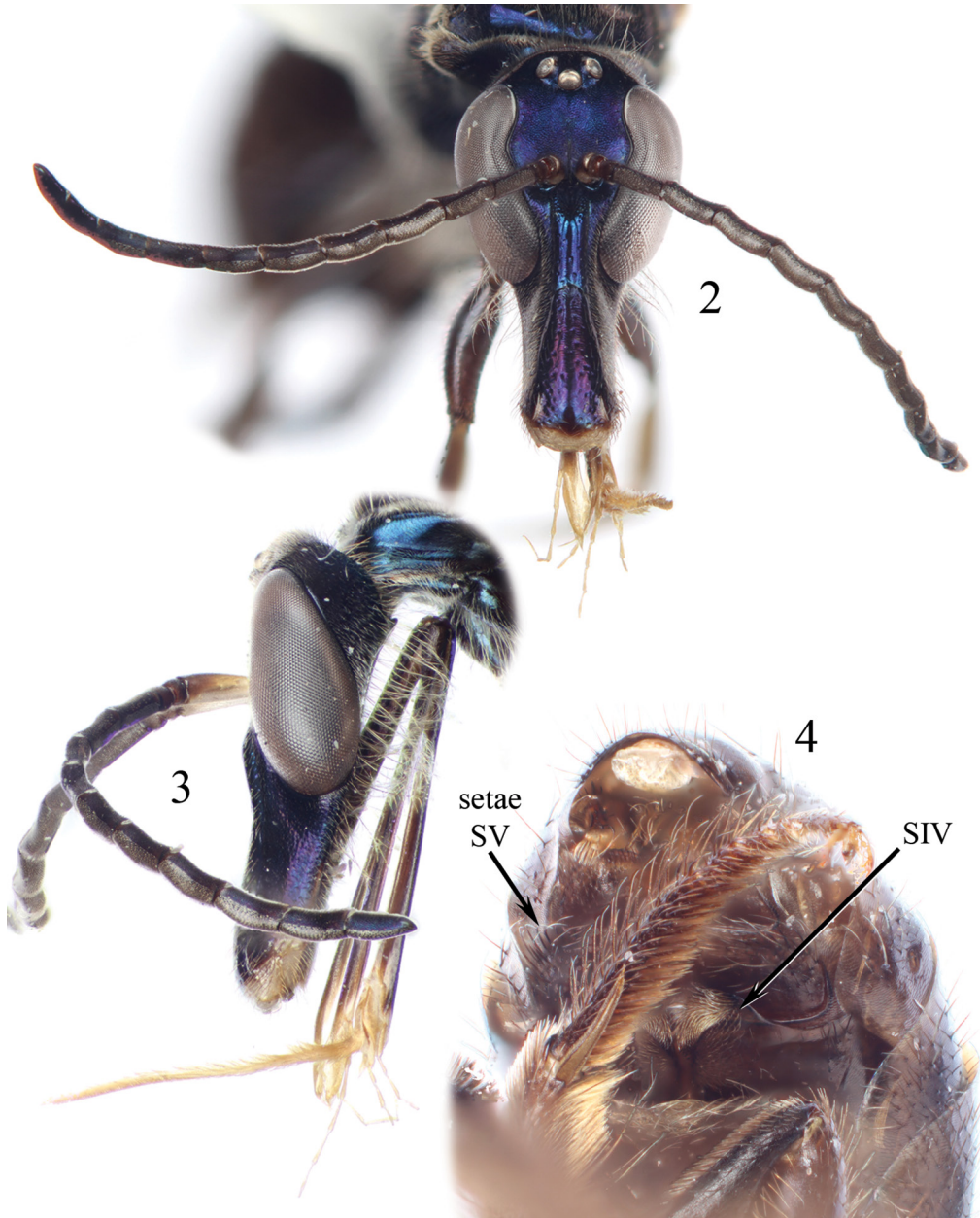
Chlerogella anchicaya Engel, Gonzalez, & Hinojosa-Díaz, new species

ZooBank: urn:lsid:zoobank.org:act:D5821CBE-F4B8-4395-AC6A-32EC81D8A58E

(Figs. 1–8)

DIAGNOSIS: The new species is most similar to *Chlerogella agaylei* Engel and *C. materdonnae* Engel, both from Ecuador. *Chlerogella anchicaya* differs from *C. materdonnae* in the azurite blue of the head and mesosoma (Figs. 1–3); the off-white mandible, labrum, and clypeal apex (Figs. 2, 3); the largely yellow scape (Fig. 3); the yellow inner surfaces of the protarsi (Fig. 1); and in details of surface sculpturing as described below. From *C. agaylei* the new species differs in the bigibbous mesoscutellum and details of surface sculpturing. The new species differs from both in the tuberculate subpleural signum, the much more elongate second flagellomere, and the form of the male terminalia (Figs. 5–8).

DESCRIPTION: ♂: Total body length 9.10 mm; forewing length 6.52 mm. Head length 3.13 mm, width 1.75 mm. Clypeus beginning well below lower tangent of compound eyes. Malar space 64% compound eye length (malar length 0.96 mm; compound eye length 1.50 mm) (Figs. 2, 3). Upper interorbital distance 0.79 mm; lower interorbital distance 0.42 mm. First flagellomere only slightly longer than pedicel, about as long as wide; second flagellomere four times length of first flagellomere; ventral surfaces of second through eleventh flagellomeres densely covered in placoid sensilla, placoid fields not disrupted. Upper portion of pronotum medially depressed, not elongate, medially less than 0.25 times ocellar diameter in length; ventral portion of preëpisternal



Figures 2–4. Details of holotype male of *Chlerogella anchicaya*, new species. 2. Facial aspect. 3. Lateral aspect of head. 4. Ventral view of apical metasomal sterna (partially obscured by metatibial apex, metatarsus, and metapretarsus), showing setose pads on medioapical extension of sternum IV and apicolateral setae on sternum V.

sulcus not broad, similar to scrobal sulcus and upper portion of preëpisternal sulcus; intertegular distance 1.46 mm; subpleural signum tuberculate; mesoscutellum weakly bigibbous, with two low paramedian tubercles. Forewing with basal vein distad cu-a by two times vein width; 1rs-m distad 1m-cu by two times vein width; 2rs-m distad 2m-cu by seven times vein width, 2rs-m weakly arched, nearly straight; first submar-



Figures 5–8. Male terminalia of *Chlerogella anchicaya*, new species. 5. Hidden sterna VII and VIII. 6. Genital capsule, lateral view. 7. Genital capsule, dorsal view. 8. Genital capsule, ventral view.

ginal cell longer than combined lengths of second and third submarginal cells; second submarginal cell slightly narrowed anteriorly, anterior border of second submarginal cell along Rs about as long as that of third submarginal cell; posterior border of third submarginal cell about 2.5 times length of anterior border. Distal hamuli arranged 2-1-2. Inner metatibial spur serrate. Apical margin of SIII entire; apical margin of SIV with short, broad median projection, projection deeply concave medially (thereby resulting in form of two paramedial, lobe-like projections) (Fig. 4); apical margin of SV entire; apical margin of SVI emarginate; terminalia as depicted in figures 5–8.

Clypeus and supraclypeal area smooth with coarse, shallow, faint punctures separated by 2–5 times a puncture width, sometimes closer along lateral borders; face with

minute punctures separated by a puncture width, more widely spaced in malar space, integument between punctures smooth; punctures of face blending to more widely spaced in ocellocular area and on vertex, punctures separated by 2–3 times a puncture width; gena smooth with minute punctures separated by 2–4 times a puncture width; postgena finely imbricate. Pronotum finely imbricate with minute sparse punctures; mesoscutum smooth with minute punctures separated by 1.5–3 times a puncture width, anteromedially punctures becoming exceedingly faint to absent; mesoscutellum as on mesoscutum; metanotum smooth with sparse minute punctures. Preëpisternum smooth with sparse minute punctures; mesepisternum smooth with sparse minute punctures separated by 3–6 times a puncture width; metepisternum smooth with minute punctures separated by 4–5 times a puncture width. Propodeum finely imbricate, more strongly so on dorsal-facing surface. Metasoma finely imbricate.

Mandible, labrum, apical margin of clypeus, and small spot apically in malar space off white to pale yellow; labiomaxillary complex dark brown except apicalmost portions, glossa, paraglossae, and palpi yellow; remainder of clypeus and head azurite blue with strong purple highlights (Fig. 2, 3). Antenna dark brown except scape pale yellow with brown dorsally in apical two-thirds. Mesosoma azurite blue, with purple highlights but weaker than those of head (Fig. 1), propodeum lighter blue than remainder of mesosoma; tegula dark brown. Wing membranes faintly infumate; veins brown to dark brown. Legs dark brown with scattered metallic blue highlights except inner surfaces of protarsi yellow. Metasoma dark brown.

Typical gender pilosity. Pubescence generally white except more golden apically on face, on legs, and on metasoma and more fuscous on meso- and metatarsi. Postgena with numerous elongate, sinuate setae, such setae with short apical branches; inner surfaces of trochanters, femora, and metatibia with elongate, apically-plumose setae except those on metatibia simple and apically sinuate. Apical margin of SIV with patches of dense, short fuscous setae on medial projection (Fig. 4); SV with apicolateral areas of more numerous, long, fuscous setae.

♀: Unknown.

HOLOTYPE: ♂, Colombia: Valle del Cauca, PNN [Parque Nacional Natural] Farallones de Cali Anchicaya, 3°26'N 76°48'W, 730 m, malaise, 16–31.x.2001 [16–31 October 2001], S. Sarria, leg., M2891 (UNCB).

ETYMOLOGY: The specific epithet is based on the name of the Anchicayá River, a watershed area known for its high biodiversity and whose origins are at the mountain Farallones de Cali in the Department of Valle del Cauca.

COMMENTS: This species belongs to a difficult group of metallic blue species with greatly elongate malar spaces more completely known from Peru and Ecuador (Engel, 2010b). This complex, here dubbed the 'azurea complex', encompasses the species *C. azurea* (Enderlein), *C. rostrata* Engel, *C. dolichorhina* Engel, *C. cyranoi* Engel, *C. agaylei*, *C. materdonnae*, and now *C. anchicaya*. *Chlerogella fortunaensis* Engel from Panama should perhaps also be included in this complex. These species are, like virtually all *Chlerogella*, known from sparse samples and are exceedingly similar in structural features. Some may eventually be discovered to be synonyms (Engel, 2010b) but presently there is insufficient evidence to suggest anything other than a series of almost cryptically-similar species.

Engel (2014) noted some similarities between species of *Caenaugochlora s.l.* and those of *Chlerogella*. To this can be added a further interesting feature, albeit one restricted to isolated taxa within each of the genera. The subpleural signum is tuberculate in *C. anchicaya* and this is the same for *Caenaugochlora (Ctenaugochlora) donnae*

Engel and more weakly so in *C. (C.) perviridis* Engel & Gonçalves (Engel, 1995a; Engel & Gonçalves, 2010). The function of such a feature is unknown.

The present taxon will run to couplet 32 in the key to South American species of *Chlerogella* (Engel, 2010b). The following modified couplets will permit its incorporation into the aforementioned dichotomous key:

- 32(30). Mesoscutellum not bigibbous, gently convex 33
 —. Mesoscutellum bigibbous, with two low paramedial tubercles 32a
 32a(32). Second flagellomere about 4 times length of first flagellomere; scape pale yellow except largely brown dorsally; mandible, labrum, and clypeal apex off white; integument of head and mesosoma brilliant azurite blue with purple highlights; subpleural signum tuberculate (Colombia) *C. anchicaya*, n. sp.
 —. Second flagellomere about 2.4 times length of first flagellomere; scape brown; mandible, labrum, and clypeal apex brown; integument of head and mesosoma brilliant, shiny caerulean blue; subpleural signum not tuberculate (Ecuador) *C. materdonnae* Engel

ACKNOWLEDGEMENTS

We are grateful to Fernando Fernandez for bringing the present specimen to our attention, and to Claus Rasmussen and an anonymous reviewer for their notes on the manuscript. This is a contribution of the Division of Entomology, University of Kansas Natural History Museum.

REFERENCES

- Almeida, E.A.B. 2008. Revision of the Brazilian species of *Pseudaugochlora* Michener 1954 (Hymenoptera: Halictidae: Augochlorini). *Zootaxa* 1679: 1–38.
- Brooks, R.W., & M.S. Engel. 1998. New bees of the genus *Ischnomelissa* Engel, with a key to the species (Hymenoptera, Halictidae, Augochlorini). *Deutsche Entomologische Zeitschrift* 45(2): 181–189.
- Brooks, R.W., & M.S. Engel. 1999. A revision of the augochlorine bee genus *Chlerogas* Vachal (Hymenoptera: Halictidae). *Zoological Journal of the Linnean Society* 125(4): 463–486.
- Coelho, B.W.T. 2004. A review of the bee genus *Augochlorella* (Hymenoptera: Halictidae: Augochlorini). *Systematic Entomology* 29(3): 282–323.
- Coelho, B.W.T., & R.B. Gonçalves. 2010. A taxonomic revision of the augochlorine bee genus *Ceratalictus* Moure (Hymenoptera, Apoidea). *Zootaxa* 2675: 1–25.
- Dalmazzo, M., & A. Roig-Alsina. 2011. Revision of the species of the New World genus *Augochlora* (Hymenoptera, Halictidae) occurring in the southern temperate areas of its range. *Zootaxa* 2750: 15–32.
- Eickwort, G.C. 1969. A comparative morphological study and generic revision of the augochlorine bees (Hymenoptera: Halictidae). *University of Kansas Science Bulletin* 48(13): 325–524.
- Engel, M.S. 1995a. Three new species of *Caenaugochlora* (*Ctenaugochlora*) (Hymenoptera: Halictidae). *Journal of the New York Entomological Society* 103(2): 281–286.
- Engel, M.S. 1995b. The bee genus *Rhectomia* (Hymenoptera: Halictidae): Discovery of the male and two new species. *Journal of the New York Entomological Society* 103(3): 302–310.
- Engel, M.S. 1997. *Ischnomelissa*, a new augochlorine bee genus (Halictidae) from Colombia. *Studies on Neotropical Fauna and Environment* 32(1): 41–46.
- Engel, M.S. 2000. Classification of the bee tribe Augochlorini (Hymenoptera: Halictidae). *Bulletin of the American Museum of Natural History* 250: 1–89.
- Engel, M.S. 2001. A monograph of the Baltic amber bees and evolution of the Apoidea (Hymenoptera). *Bulletin of the American Museum of Natural History* 259: 1–192.

- Engel, M.S. 2003a. A new species of the bee genus *Chlerogella* from Panama (Hymenoptera: Halictidae). *Zootaxa* 286: 1–4.
- Engel, M.S. 2003b. A new bee of the genus *Chlerogella* from Ecuador (Hymenoptera, Halictidae). In: Melo, G.A.R. & I. Alves dos Santos (Eds.), *Apoidea: Neotropica: Homenagem aos 90 Anos de Jesus Santiago Moure*: 135–137. Editora UNESC [Universidade do Extremo Sul Catarinense]; Criciúma, Brazil; xvi+320 pp.
- Engel, M.S. 2007. Two new augochlorine bees from Ecuador (Hymenoptera: Halictidae). *Acta Entomologica Slovenica* 15(1): 21–29.
- Engel, M.S. 2009a. Notes on the augochlorine bee genus *Chlerogas* (Hymenoptera: Halictidae). *Caldasia* 31(2): 449–457.
- Engel, M.S. 2009b. Revision of the bee genus *Chlerogella* (Hymenoptera, Halictidae), Part I: Central American species. *ZooKeys* 25: 47–75.
- Engel, M.S. 2010a. The bee genus *Chlerogas* in Bolivia (Hymenoptera, Halictidae). *ZooKeys* 46: 61–70.
- Engel, M.S. 2010b. Revision of the bee genus *Chlerogella* (Hymenoptera, Halictidae), Part II: South American species and generic diagnosis. *ZooKeys* 47: 1–100.
- Engel, M.S. 2011. Systematic melittology: Where to from here? *Systematic Entomology* 36(1): 2–15.
- Engel, M.S. 2013a. The bee genus *Ischnomelissa* in Peru, with a key to the species (Hymenoptera: Halictidae). *Journal of Melittology* 23: 1–5.
- Engel, M.S. 2013b. Revision of the cleptoparasitic bee genus *Cleptommation* (Hymenoptera: Halictidae). *Journal of Melittology* 22: 1–26.
- Engel, M.S. 2014. The bee genus *Caenaugochlora* in Venezuela (Hymenoptera: Halictidae). *Journal of Melittology* 33: 1–10.
- Engel, M.S., & R.W. Brooks. 1998. The nocturnal bee genus *Megaloptidia* (Hymenoptera: Halictidae). *Journal of Hymenoptera Research* 7(1): 1–14.
- Engel, M.S., & R.W. Brooks. 1999a. The augochlorine bee genus *Megaloptilla* (Hymenoptera: Halictidae). *University of Kansas Natural History Museum Special Publication* 24: 9–15.
- Engel, M.S., & R.W. Brooks. 1999b. A new *Chlerogelloides* from French Guiana, with comments on the genus (Hymenoptera: Halictidae). *Journal of the Kansas Entomological Society* 72(2): 160–166.
- Engel, M.S., & R.W. Brooks. 2002. A new bee of the genus *Ischnomelissa*, with a key to the known species (Hymenoptera: Halictidae). *Entomological News* 113(1): 1–5.
- Engel, M.S., & R.B. Gonçalves. 2010. A revised key to the species of *Caenaugochlora* (*Ctenaugochlora*), with the description of a new species from Costa Rica (Hymenoptera: Apoidea: Augochlorini). *Genus* 21(1): 101–110.
- Engel, M.S., & V.H. Gonzalez. 2009. A new species of *Chlerogas* from the Andes of central Colombia (Hymenoptera: Halictidae). *Caldasia* 31(2): 441–447.
- Engel, M.S., & C. Rasmussen. 2013. Revision of the bee genus *Chlerogella* (Hymenoptera: Halictidae), Part III: New records and a new species from Peru. *Journal of Melittology* 9: 1–8.
- Engel, M.S., & A.H. Smith-Pardo. 2012. Bolivian *Neocorynura* (Hymenoptera: Halictidae): A new species and preliminary key to the fauna. *Tijdschrift voor Entomologie* 155(1): 3–8.
- Engel, M.S., R.W. Brooks, & D. Yanega. 1997. New genera and subgenera of augochlorine bees (Hymenoptera: Halictidae). *Scientific Papers, Natural History Museum, University of Kansas* 5: 1–21.
- Engel, M.S., F.F. de Oliveira, & A.H. Smith-Pardo. 2006. A new species of the bee genus *Chlerogas* Vachal from Ecuador (Hymenoptera: Halictidae). *Entomologist's Monthly Magazine* 142(1703–1705): 103–106.
- Gonçalves, R.B. 2010a. Notes on the identity of *Halictus glabrescens* Cockerell and description of a new species of *Halictillus* Moure (Hymenoptera, Apidae s.l., Halictinae). *Neotropical Entomology* 39(5): 752–756.
- Gonçalves, R.B. 2010b. Phylogeny and revision of the Neotropical bee genus *Rhectomia* s.l. Moure (Hymenoptera, Apidae, Augochlorini). *Systematic Entomology* 35(1): 90–117.
- Gonçalves, R.B., & M.S. Engel. 2010. The bee genus *Caenaugochlora* (Hymenoptera, Apoidea) and its constituent subgenera, with new species of *Caenaugochlora* s.str. from Ecuador. *ZooKeys* 37: 69–80.

- Gonçalves, R.B., & G.A.R. Melo. 2006. Revision of the bee genus *Thectochlora* Moure (Hymenoptera, Apidae, Halictinae). *Zootaxa* 1331: 1–30.
- Gonçalves, R.B., & G.A.R. Melo. 2012. Phylogeny and revision of the bee genus *Rhinocorynura* Schrottky (Hymenoptera, Apidae, Augochlorini), with comments on its female cephalic polymorphism. *Revista Brasileira de Entomologia* 56(1): 29–46.
- Gonçalves, R.B., & L.M. Santos. 2010. Notes and new species of the halictine bee genus *Megommation* Moure (Hymenoptera, Apidae, Augochlorini). *Zootaxa* 2685: 57–64.
- Gonzalez, V.H., T. Griswold, & R. Ayala. 2010. Two new species of nocturnal bees of the genus *Megalopta* (Hymenoptera: Halictidae) with keys to species. *Revista de Biología Tropical* 58(1): 255–263.
- Gonzalez, V.H., T. Griswold, & M.S. Engel. 2013. Obtaining a better taxonomic understanding of native bees: Where do we start? *Systematic Entomology* 38(4): 645–653.
- Michener, C.D. 2007. *The Bees of the World* [2nd Edition]. Johns Hopkins University Press; Baltimore, MD; xvi+[i]+953 pp., +20 pls.
- Moure, J.S. 1960. A review of the genus *Paroxystoglossa* (Hymenoptera: Halictidae). *University of Kansas Science Bulletin* 40(5): 121–133.
- Oliveira, F.F., de, M.S. Engel, & T. Mahlmann. 2012. A new *Chlerogelloides* from northeastern Brazil and French Guiana, with a key to the species (Hymenoptera, Halictidae). *ZooKeys* 185: 41–53.
- Santos, L.M., & F.A. Silveira. 2009. Taxonomic notes on *Megalopta* Smith, 1853 (Hymenoptera: Halictidae: Augochlorini) with a synopsis of the species in the state of Minas Gerais, Brazil. *Zootaxa* 2194: 1–20.
- Smith-Pardo, A.H. 2005a. Systematics and mimicry of the genus *Neocorynura*: An example of two species from Central America (Hymenoptera: Halictidae). *Acta Zoologica Cracoviensia* 48B(1–2): 11–21.
- Smith-Pardo, A.H. 2005b. The bees of the genus *Neocorynura* of Mexico (Hymenoptera: Halictidae: Augochlorini). *Folia Entomológica Mexicana* 44(2): 165–193.
- Smith-Pardo, A.H. 2010. Taxonomic review of the species of *Neocorynura* (Hymenoptera: Halictidae: Augochlorini) inhabiting Argentina and Paraguay. *Zootaxa* 2507: 44–68.
- Smith-Pardo, A.H., & M.S. Engel. 2004. The bee genus *Micrommation* (Hymenoptera: Halictidae): A new diagnosis and description of the male. *Folia Heyrovskyana* 12(4): 179–189.
- Smith-Pardo, A.H., & V.H. Gonzalez. 2009. A revision of *Neocorynura* bees of the *joannisi* group with new geographical records for other Andean species (Hymenoptera: Halictidae, Augochlorini). *Studies on Neotropical Fauna and Environment* 44(2): 115–129.



Journal of JM Melittology

A Journal of Bee Biology, Ecology, Evolution, & Systematics

The *Journal of Melittology* is an international, open access journal that seeks to rapidly disseminate the results of research conducted on bees (Apoidea: Anthophila) in their broadest sense. Our mission is to promote the understanding and conservation of wild and managed bees and to facilitate communication and collaboration among researchers and the public worldwide. The *Journal* covers all aspects of bee research including but not limited to: anatomy, behavioral ecology, biodiversity, biogeography, chemical ecology, comparative morphology, conservation, cultural aspects, cytogenetics, ecology, ethnobiology, history, identification (keys), invasion ecology, management, melittopalynology, molecular ecology, neurobiology, occurrence data, paleontology, parasitism, phenology, phylogeny, physiology, pollination biology, sociobiology, systematics, and taxonomy.

The *Journal of Melittology* was established at the University of Kansas through the efforts of Michael S. Engel, Victor H. Gonzalez, Ismael A. Hinojosa-Díaz, and Charles D. Michener in 2013 and each article is published as its own number, with issues appearing online as soon as they are ready. Papers are composed using Microsoft Word® and Adobe InDesign® in Lawrence, Kansas, USA.

Editor-in-Chief

Michael S. Engel
University of Kansas

Assistant Editors

Victor H. Gonzalez
University of Kansas

Charles D. Michener
University of Kansas

Journal of Melittology is registered in ZooBank (www.zoobank.org), archived at the University of Kansas and in Portico (www.portico.org), and printed on demand by Southwestern Oklahoma State University Press.

<http://journals.ku.edu/melittology>
ISSN 2325-4467