

ARTICLE

A new species of the bee genus *Chlerogelloides* ENGEL, BROOKS & YANEGA, 1997 from the rainforest of French Guiana (Hymenoptera: Apoidea: Halictidae)

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MONKS, J. (2025). A new species of the bee genus *Chlerogelloides* ENGEL, BROOKS & YANEGA, 1997 from the rainforest of French Guiana (Hymenoptera: Apoidea: Halictidae). *Osmia*, 13: 69–76. <https://doi.org/10.47446/OSMIA13.4>

Abstract

The rare genus *Chlerogelloides* ENGEL, BROOKS & YANEGA, 1997 to date consists of three species from across the Amazonian region of South America, including Brazil, Colombia, Ecuador, French Guiana and Peru. A fourth species *Chlerogelloides paetzae* **sp. n.** is described herein from females collected in French Guiana. A key to the females of this genus is given.

Keywords | *Chlerogelloides paetzae* • Guiana Shield • Augochlorini • Neotropical bees • South America

Une nouvelle espèce d'abeille du genre *Chlerogelloides* ENGEL, BROOKS & YANEGA, 1997 de la forêt tropicale de Guyane française (Hymenoptera : Apoidea : Halictidae)

Résumé

Le genre rare *Chlerogelloides* ENGEL, BROOKS & YANEGA, 1997 comprend à ce jour trois espèces distribuées dans la région amazonienne d'Amérique du Sud, notamment au Brésil, en Colombie, en Équateur, en Guyane française et au Pérou. Une quatrième espèce, *Chlerogelloides paetzae* **sp. n.**, est décrite ici à partir de femelles collectées en Guyane française. Une clé des femelles de ce genre est proposée.

Mots-clefs | *Chlerogelloides paetzae* • Plateau des Guyanes • Augochlorini • Abeilles néotropicales • Amérique du Sud



Reçu - Received | 01 May 2024 || **Accepté - Accepted** | 08 December 2025 || **Publié (en ligne) - Published (online)** | 26 December 2025
Reviewers | B. GIVORD-COUPÉAU • M. ZAKARDJIAN • M. ENGEL || <https://zoobank.org/02DB92F0-95B0-4B0B-8831-200007652059>

INTRODUCTION

The Hymenoptera of French Guiana remains relatively unknown (BRÛLÉ & TOUROULT, 2014). Current bee species richness is recorded at ~ 199 species (ASCHER & PICKERING, 2024). FREITAS *et al.* (2009) estimate a total fauna of 439 species for the territory, the lowest number of species for the whole of South America (FREITAS *et al.*, 2009). Therefore, only around 45 % of species have so far been recorded. For the Guianas as a whole, including in addition to French Guiana, Guyana and Suriname, a total of ~ 338 species have been recorded (ASCHER & PICKERING, 2024). At ~ 247 species, the Apidae is by far the most species rich family in the region.

However, the Halictidae tribe Augochlorini COCKERELL, 1897, a group only recorded in the western hemisphere, is well represented in French Guiana, including the genera *Augochlora* SMITH, 1853, *Augochloropsis* COCKERELL, 1897,

Chlerogelloides ENGEL, BROOKS & YANEGA, 1997, *Cleptommation* ENGEL, BROOKS & YANEGA, 1997, *Megalopta* SMITH, 1853 and *Megaloptidia* COCKERELL, 1900. Two species of *Chlerogelloides* are already recorded from French Guiana. The holotype of *Chlerogelloides simplex* ENGELS & BROOKS, 1999 is known from near Roura, close by the type locality of the herein reported species *Chlerogelloides paetzae* **sp. n.** Additionally paratypes of *Chlerogelloides nexosa* DE OLIVEIRA, ENGEL & MAHLMANN, 2012 were also collected in French Guiana, from Saül in the centre of the territory. *Chlerogelloides femoralis* ENGEL, BROOKS & YANEGA, 1997 is known from the western Amazon region, including Colombia, Ecuador and Peru (ENGEL *et al.*, 1997). The French Guiana record for *C. femoralis* in ENGEL *et al.*, 1997, is noted as a mistaken identification and is actually *C. simplex* (ENGEL & BROOKS, 1999).

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Chlerogelloides ENGEL, BROOKS & YANEGA, 1997 is one of four genera within the Augochlorini that are easily recognisable by their elongated faces: *Chlerogas* VACHAL, 1904, *Chlerogella*, MICHENER, 1954 and *Ischnomelissa*, ENGEL, 1997. Within these genera, the elongation is due to the malar space, whereas in *Chlerogelloides*, the extended head is due to the long clypeus and supraclypeal region, the malar space being short.

Through a molecular and morphological phylogeny, *Chlerogella*, *Chlerogelloides* and *Ischnomelissa* have been shown to form a clade, the *Chlerogella* group (GONÇALVES,

2016). Though morphologically close to *Chlerogella*, the molecular results of the study showed *Chlerogas* to be part of the *Neocorynura* group along with *Andinaugochlora* EICKWORT, 1969, *Megaloptilla* MOURE & HURD, 1987, *Neocorynura* SCHROTTKY, 1910, *Neocorynurella* ENGEL, 1997, *Paraoxystoglossa* MOURE, 1941, and *Rhynchochlora* ENGEL, 2007 (GONÇALVES, 2016).

In this study, a fourth species of *Chlerogelloides* collected from French Guiana is recorded. A key to the females of this genus is provided.

MATERIAL & METHODS

French Guiana is a small territory of 84,000 km² (BRÛLÉ & TOUROULT, 2014) situated between Brazil and Suriname with rainforest covering over 90 % of the country (GUITET *et al.*, 2015). Samples were collected as part of general surveying for Hymenoptera. The specimens were caught by hand net from Kaw Mountain, a small tepui (337 m) located southeast

of the capital Cayenne supporting typical Guianan rainforest habitat (figures 1–2). The type locality was alongside a road surrounded by dense forest on both sides. Terminology follows MICHENER (2007), except the use of the term mesoscutum instead of scutum. Tergites are abbreviated to T1–6.



Figure 1. Type locality of *C. paetzae* sp. n. on Kaw Mountain, French Guiana. Photo J. MONKS.



Figure 2. Forest on Kaw Mountain, French Guiana. Photo J. MONKS.

RESULTS

***Chlerogelloides paetzae* sp. n.**

[ZooBank](https://zoobank.org/e8674033-f609-4138-a811-b8ecc3854a5d) <https://zoobank.org/e8674033-f609-4138-a811-b8ecc3854a5d>

Holotype

♀, French Guiana: Kaw Mountain, 4.549532 °N 52.173358 °W, 299 m, 23.X.2023, leg. J. MONKS. Specimen deposited in the type collection of the Natural History Museum, UK (NHMUK 015663911).

Paratype

1 ♀, label data the same as the holotype. Specimen deposited in the main Hymenoptera collection of the Natural History Museum, UK (NHMUK 015663912).

Diagnosis

Minute species (~ 7 mm), with a smooth integument predominately honey yellow (figures 3–5). Head and mesoscutum black with green metallic reflections on the face above the clypeus. Blue metallic tinges on genae. Vertex almost flat medially (figure 6). Scutellum with two brown lines (figure 4). Extensive brown bands on all tergites. Scopa present on the hind tibia weak with long, straight golden hairs throughout. Scopal hairs densely plumose along the lower margin of the hind femur. Integument smooth, except strong but shallow punctuation on the clypeus and supraclypeal area. *Chlerogelloides paetzae* sp. n. can be separated from *C. simplex* by the yellow coloration of the clypeus and basal area of the propodeum (figures 3, 6). *C. paetzae* sp. n. can then be further separated from *C. femoralis* (figures 8–9) by the almost straight vertex, versus more oval shaped head, rounded, in *C. femoralis* (figures 6, 7). The two species can also be separated by the blue–green metallic reflections on the head and mesoscutum of *C. paetzae* sp. n., as opposed to brassy green in *C. femoralis*.

Head

Labrum, clypeus, and mandibles excluding apex of the teeth, honey yellow. Apex of mandibles red. Face above clypeus, including genae, black with metallic green reflections, strongest in supraclypeal and paraocular areas. Vertex and genae with slight metallic blue tinge (figure 5). Mandible with a subapical tooth. Head raised above ocelli, vertex almost flat medially.

Mesosoma

Pronotum, propodeum, fore and mid-legs honey yellow. Mesoscutum dark brown, shiny. Tegulae and axillae reddish brown. Scutellum orange with two brown longitudinal bands. Metanotum medially brown, laterally orange. Hind coxae, trochanter and femur honey yellow. Hind tibia dark brown, basitarsus and tarsal segments honey yellow. Mid and hind tarsal claws yellow proximally, black distally. Fore tarsal claws yellow proximally, red distally. Stigma and veins dark brown (figure 3). Dorsal surface of propodeum completely smooth and glabrous, ventral surface with weak longitudinal striations. Hind inner tibial spur serrate. Stigma large and wing veins strong. Marginal cell acute. First submarginal cell at least as long as the second and third combined.

Metasoma

T1 marginal zone and T2 pregradular area with a continual brown band (figure 4). Band on T2 marginal zone broken medially, continuous across T3 pregradular area. Continuous broad brown band across T3 marginal zone extending laterally to midlevel of T3. T4 band rising medially and extending laterally to almost T3. T5 brown. T1–4 outside of brown bands honey yellow.



Figure 3. Holotype of *Chlerogelloides paetzae* sp. n. (dorsal view). Photo J. MONKS.



Figure 4. Holotype of *C. paetzae* sp. n. (quarter view). Photo J. MONKS.



Figure 5. Holotype of *C. paetzae* sp. n. (lateral view). Photo J. MONKS.

Pubescence

Hairs predominately simple throughout except appressed branched hairs on the frons, long erect branched hairs on the hind margin of the genae, and strongly plumose hairs

forming the scopa on the lower margin of the hind femur.

Male

The male remains currently unknown.



Figure 6. Face of *C. paetzae* sp. n. showing the medially straight line of the vertex and oval shape of the head. Photo A. POLASZEK.



Figure 7. Face of female *C. femoralis*. Photo A. POLASZEK.



Figure 8. Female of *C. femoralis* (lateral view). Photo J. MONKS.



Figure 9. Female of *C. femoralis* (dorsal view). Photo J. MONKS.

Etymology

Named after the authors wife's maiden name, PAETZ.

Key to the females *Chlerogelloides*

The key is based on that of DE OLIVEIRA *et al.* (2012). *Chlerogelloides nexosa* DE OLIVEIRA *et al.* (2012) is excluded as only the male is known from the species.

1. Clypeus and basal area of propodeum brown *C. simplex* ENGEL & BROOKS
 - Clypeus and basal area of propodeum yellow 2
2. Face above clypeus brassy green. Vertex rounded. Head elongate. Clypeal punctures sparse (figure 3) *C. femoralis* ENGEL *et al.*
 - Face above clypeus metallic green and blue. Vertex flat medially. Head broad. Clypeus with clear shallow punctures (figure 1) *C. paetzae* sp. n.

DISCUSSION

Another species of *Chlerogelloides* collected from the French Guiana forests suggests the species of this genus are specialists of the Amazonian rainforest. With three of the four species recorded from French Guiana, but with a distribution for the genus that stretches to Ecuador and Peru, it is likely there are additional undescribed species. In addition to variation of the metallic reflections, the vertex and shape of the head of the newly described species demonstrates the importance of these characters in separating the species within this genus.

To date, the female of *C. nexosa* is unknown. Therefore, as this species is already recorded from French Guiana, it is possible *C. paetzae* sp. n. is actually the female of this species (M. ENGEL, comm. pers.). However, in both *C. femoralis* and *C. simplex* the metallic reflections on the head and mesosoma in the two sexes are very similar, *i. e.* mostly metallic green in the anterior part of the body in *C. femoralis* and in the head of *C. simplex*, in the latter the rest of the body lack metallic reflections except in some females with slight blue-green highlights on the mesoscutum (ENGEL *et al.*, 1997; ENGEL & BROOKS, 1999). Therefore, based on these two species, it may be expected that the female of *C. nexosa* would show the same or similar metallic colours than the male. However, it has metallic, olive green reflections on the head, mesoscutum, scutellum, and metanotum (OLIVEIRA *et al.*, 2012). Conversely, in *C. paetzae* sp. n. the head is dark with blue-green reflections. The integument of the mesoscutum is dark brown and the scutellum and metanotum are a lighter orange-brown. In *C. nexosa* the mesoscutum, scutellum and metanotum are all metallic olive green. With the evidence to date, it would therefore suggest *C. paetzae* sp. n. is a valid species. However, through direct observations of live individuals of both sexes or DNA barcodes, it may be possible to match the missing sexes in these two species with definitive confidence.

Due to the dense rainforest in French Guiana making access to the forest interior often physically impossible (figure 8), collecting and observation of bees is prohibited to along the edges of roads, a semi-natural, disturbed environment (figure 1). Therefore, the currently recorded bee species richness of French Guiana is clearly underestimated. Rather than simply relying on hand netting, future collecting in this region may need to rely more on a combination of coloured pans, flight interception traps, and Malaise traps in addition to the use of nets. While these methods show bias towards certain taxa, for example higher numbers of *Lasioglossum* (Halictidae) and *Hylaeus* (Colletidae) in white pan traps (SPEARS *et al.*, 2021), they may collect specimens otherwise missed in this complex environment. Malaise traps are known to be of limited use for collecting bees (CAMPBELL & HANULA, 2007). Often larger species are able to escape before being funnelled towards the collecting bottle. However recent Malaise trap samples from Iraq and Kuwait sorted by the author, show that while abundance is not high, they can still collect rarer taxa (e.g., *Nomadinae*: *Nomada* and *Biastes*). Consequently, a range of collecting methods may need to be applied in complex environments such as French Guiana.

Additionally, the dense nature of the French Guiana forest (figure 2) prohibits easy observation of bees foraging patterns. While all *Chlerogelloides* species have been recorded from the Amazonian rainforest (ENGEL *et al.*, 1997; ENGEL & BROOKS, 1999; DE OLIVEIRA *et al.*, 2012), the only recorded biological information for the genus is that *C. nexosa* has been observed at the flowers of *Cordia nodosa* LAM. (Boraginaceae) and *Gonzalagunia dicocca* CHAM. & SCHLTDL (Rubiaceae) (DE OLIVEIRA *et al.*, 2012). While specimens of this genus are rare within museum collections, as more material becomes available, metabarcoding of pollen loads from museum specimens would be one way to illuminate *Chlerogelloides*–plant interactions in these forests.

ACKNOWLEDGMENTS

I would like to thank the Ministère de la Transition écologique et solidaire for processing the collecting and export permits. I also extend my thanks to Dr. Martin EBEJER (Fellow at National Museum Wales) for organising the collecting trip, which resulted in this new species. Finally, I thank Dr. Andrew POLASZEK of the Natural History Museum, London for assistance in photographing the bee faces. The editorial team would also like to thank Michael ENGEL for his time and expertise, despite the very short deadline.

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