**TWO NEW AUGOCHLORINE BEES FROM ECUADOR
(HYMENOPTERA: HALICTIDAE)**

Michael S. ENGEL

Division of Invertebrate Zoölogy, American Museum of Natural History,
Central Park West at 79th Street, New York, New York 10024-5192, United States
&

Division of Entomology (Palaeoentomology), Natural History Museum and
Department of Ecology & Evolutionary Biology, 1501 Crestline Drive–Suite #140,
University of Kansas, Lawrence, Kansas 66049-2811, United States

Abstract – Two new species of augochlorine bees are described and figured from Ecuador. *Caenaugochlora silvicola* sp. n. is the first species of its genus with a relatively elongate malar space (although admittedly still shorter than true long-headed augochlorines) and can be readily distinguished from other *Caenaugochlora* by this trait as well as characters of coloration and integumental sculpturing. *Caenaugochlora cuprina* Moure & Hurd (= *Augochlora cupriventris* Friese), also from Ecuador, has proven to be a junior synonym of *Megaloptilla callopis* (Vachal) (syn. n.). Thus, *C. silvicola* sp. n. is the first true species of this genus formally documented from Ecuador. The second species does not correspond to any known group of augochlorines and is placed in a new genus herein. *Rhynchochlora chlerogopsis* gen. et sp. n. is most similar to *Chlerogas* but differs in head, antennal, and mesoscutellar structure.

KEY WORDS: Anthophila, Apoidea, Augochlorini, Ecuador, new genus, new species, taxonomy.

**Izveček – DVE NOVI ČEBELI PLEMENA AUGOCHLORINI IZ EKVADORJA
(HYMENOPTERA: HALICTIDAE)**

Opisani in prikazani sta dve novi vrsti čebel plemena Augochlorini iz Ekvadorja. *Caenaugochlora silvicola* sp. n. je prva predstavnica svojega rodu z razmeroma dolgimi ličnicami (čeprav so še vedno krajše kot pri pravih dolgoglavih augoklorinah) in jo lahko od drugih vrst rodu *Caenaugochlora* ločimo po tej značilnosti, kot tudi po razlikah v obarvanosti in površinski strukturi. *Caenaugochlora cuprina* Moure & Hurd (= *Augochlora cupriventris* Friese), prav

tako iz Ekvadorja, se je izkazala za mlajši sinonim vrste *Megaloptilla callopis* (Vachal) (syn. n.). Tako je *C. silvicola* sp. n. prva vrsta tega rodu resnično zabeležena v Ekvadorju. Druga vrsta ne ustreza nobeni znani skupini augoklorin in je uvrščena v nov rod. *Rhynchochlora chlerogopsis* gen. et sp. n. je najbolj podobna rodu *Chlerogas*, vendar se razlikuje v zgradbi glave, tipalnic in mezoskuteluma.

KLJUČNE BESEDE: Anthophila, Apoidea, Augochlorini, Ekvador, nov rod, nove vrste, taksonomija.

Introduction

Bees of the tribe Augochlorini are among the most widely and commonly encountered of Neotropical Anthophila. Species are typically brilliant metallic in color and species of the tribe range from solitary to primitively eusocial. During recent taxonomic work on the tribe two new species were recognized among material from Ecuador, one belonging to a new genus. These interesting new species are described herein (*vide infra*) to bring them to the attention of melittologists so that more may be learned of these rare bees (*e.g.*, floral associations) and so that additional specimens (particularly males) might eventually be discovered. Gonzalez & Engel (2004) recently summarized the tropical Andean bee fauna (*i.e.*, species occurring above 2500m). One of the species described herein (*Caenaugochlora silvicola* sp. n.) can be added to their list as it was captured at 2700m near Banos in Tungurahua Province.

Morphological terminology in the descriptions follows that of Engel (2000, 2001) while the format follows that generally employed elsewhere for Augochlorini (*e.g.*, Engel, 1999; Engel & Brooks, 1998; Engel *et al.*, 1997). The abbreviations F, S, and T replace flagellomere, metasomal sternum, and metasomal tergum, respectively. Measurements were made with an ocular micrometer on an Olympus SZX12 microscope and photomicrographs were prepared using a Microptics ML-1000 Digital Imaging System.

Systematics

Caenaugochlora (Caenaugochlora) silvicola Engel sp. n. (Figs. 1–2)

Holotypus: ♀, labeled: Ecuador, Tungurahua, Banos, Rio Bascán, 12.III.1987, 2700m, M. Cooper // Holotype, *Caenaugochlora silvicola*, Michael S. Engel [red label]. Deposited in the Natural History Museum, London.

Diagnosis: Head longer than wide, clypeus below lower tangent of compound eyes, with malar space as long as basal mandibular width (Fig. 1); setae of compound eyes absent; head and mesosoma brilliant metallic green; metasoma brilliant metallic red (Figs. 1–2); basal area of propodeum with striae radiating from basal margin, border with posterior surface sharply angled; S1 with short, broadly-triangular, medioapical process; integument of head and mesosoma distinctly granular.

Description: ♀: Total body length 10.6 mm; forewing length 8.4 mm. Head longer than wide (length 2.7 mm, width 2.2 mm); entirety of clypeus beyond lower tangent of compound eyes. Mandible with weak subapical tooth. Malar space as long as basal mandibular width (unique among described *Caenaugochlora*). Compound eyes bare. Preoccipital ridge carinate. Intertegular distance 2.2 mm. Inner metatibial spur pectinate, with four teeth excluding apical tooth. Forewing with basal vein distad cu-a by 3.5 times vein width; 1m-cu confluent with 1rs-m; 2m-cu basad 2rs-m by 6 times vein width, 2rs-m very weakly arched; first submarginal cell about as long as combined lengths of second and third submarginal cells; anterior border of second submarginal cell slightly shorter than anterior border of third submarginal cell; posterior border of second submarginal cell only very slightly greater than anterior border of cell (thus, cell is generally rectangular in shape rather than distinctly trapezoidal); posterior border of third submarginal cell slightly less than twice anterior border of cell; hind wing with distal hamuli arranged 4-1-4. Basal area of propodeum slightly longer than metanotum, distinctly shorter than mesoscutellum; posterior border of basal area sharply angled but not carinate. First metasomal sternum with short, broadly-triangular, medioapical process.

Head and mesosoma granular, with faint, scattered punctures, such punctures more noticeable on clypeus and pleura. Basal area of propodeum with longitudinal striae radiating from basal margin, striae reaching apical margin. Terga and sterna imbricate; terga with minute, scattered punctures.

Integument of head and mesosoma brilliant metallic green, with coppery highlights on face. Mandible, labrum, malar space, apical margin of clypeus, antenna, legs, tegula, metasomal sterna dark brown or nearly black, except mandibular apex and distal process of labrum brown. Wing veins brown, membrane lightly fuscous except slightly darker in marginal cell. Metasoma brilliant metallic red with purplish highlights.

Pubescence generally pale yellow except mostly fuscous on face, inner and posterior surfaces of middle and hind legs, mesoscutum, mesoscutellum, pleura, and fifth metasomal tergum and sternum. Setae of sternal discs relatively long, dense, white, and slightly wavy.

♂: Unknown.

Derivatio nominis: The specific epithet is a combination of the Latin words *silva* (meaning “forest”) and *colo* (meaning “dwelling in”).

Megaloptilla callopis (Vachal)

Halictus callopis Vachal, 1911: 41.

Augochlora cupriventris Friese, 1925: 6. **Syn. n.**

Oxystoglossidia callopis (Vachal); Moure, 1944: 69.

Megommation (Megaloptilla) callopis (Vachal); Moure & Hurd, 1987: 241.

Caenaugochlora cuprina Moure & Hurd, 1987: 233. *Nomen novum pro C. cupriventris* (Friese, 1925), *nec C. cupriventris* (Vachal, 1904). **Syn. n.**

Megaloptilla callopis (Vachal); Engel & Brooks, 1999: 11.

Remarks: This species was described thoroughly by Engel & Brooks (1999) based on the type as well as newly collected material and for this reason the description is not repeated or elaborated upon here. For a complete account of the species refer to Engel & Brooks (1999). The species is mentioned so as to establish the above synonymies.

***Rhynchochlora* Engel gen. n.**

Species typicum: *Rhynchochlora chlerogopsis* Engel sp. n.

Diagnosis: ♀: Mandible with small, weak, rounded subapical tooth. Labrum with distal process narrowly triangular, with apical keel, lateral teeth weak; basal elevation weakly developed and scarcely evident, with roughly circular shape and extending beyond apical margin. Prementum not greatly elongate; glossa long, more than one-half length of prementum (Fig. 4); combined lengths of labial palpomeres II and III about as long as palpomere I. Galeal comb absent; apex lobed, with patch of stiff setae; galeal base extending posteriorly to base of stipes. Hypostomal ridge carinate, weakly lamellate anteriorly; anterior angle rounded; posteriorly not projecting beyond margin of head. Malar space as long as basal mandibular width (Figs. 3–4). Epistomal sulcus forming acute angle. Ocelli not greatly enlarged; ocellar furrow absent. Vertex not expanded or ridged posterior to ocelli. Antennal flagellum with 10 flagellomeres. Preoccipital ridge strongly angled, somewhat carinate. Mesoscutum weakly narrowed medioapically; mesoscutal anterior border rounded, with short anterior-facing surface merging into pronotum. Tegula oval. Probasitarsal brush present, weak. Metabasitibial plate distinct on anterior and posterior borders, pointed at apex, relatively short. Scopa formed of long, plumose setae on metafemur, setae generally black except overlaid by a row of golden, plumose setae; inner surface of metatibia with dense, pale yellow, palmate setae. Inner metatibial spur pectinate, teeth not densely packed together. Marginal cell apex acute. Distal hamuli irregularly spaced (3-1-3). Basal area of propodeum as long as mesoscutellum, surface granular, border between basal area and posterior surface broadly rounded; propodeal pit narrow, slit-like. Metasoma unmodified.

Derivatio nominis: The new genus-group name is a combination of the Greek words *rhynchos* (meaning “snout”) and *chloros* (meaning “green”: also suffix of *Augochlora*, type genus for the tribe). The name literally means “green snout” and is a reference to the elongate muzzle of this group as well as its greenish-coppery hue on the head and mesosoma (Figs. 3–5) and placement in the tribe Augochlorini (subtribe Augochlorina).

Remarks: Among bees of the tribe Augochlorini a few are quickly notable for their greatly elongate heads, the result of an expanded malar space. These species are quite uncommon or even rare in collections and not all the genera including such species are closely related (*e.g.*, *Chlerogas* is distantly related to *Chlerogella*: Engel, 2000). As recently as ten years ago only four such species were known, two in the genus *Chlerogas* (then known only from males) and two in the genus *Chlerogella*

(then known only from females) (Moure & Hurd, 1987). A few species of the genus *Ischnomelissa* were subsequently discovered to also exhibit greatly elongate malar spaces (Brooks & Engel, 1998), although the genus was originally characterized by a species without such a modification (Engel, 1997). During the past several years I have been involved in a series of studies designed to explore and revise the diversity of these long-headed bees. The genus *Chlerogas* has now grown to ten species (Brooks & Engel, 1999, Engel *et al.*, 2006) and another *Ischnomelissa* with this same feature has also been discovered (Engel & Brooks, 2002). During the completion of a monograph of the last genus, *Chlerogella* (now with 16 species and, like *Ischnomelissa*, exhibiting variation in malar length: Engel, 2003a, 2003b, in prep.), the single female of this remarkable new genus was recognized among material sent by Mr. Martin Cooper. As in the other groups, the malar space is greatly elongate but the new species could not be classified into any existing genus of the tribe. This type species is immediately reminiscent of *Chlerogas* but lacks the scutellar tubercles as well as the most distinctive synapomorphy of this genus, namely the reduction in the total number of flagellomeres (a feature unique to *Chlerogas* among the Halictinae). Unlike *Chlerogella*, *Ischnomelissa*, and their relative *Chlerogelloides*, the new group lacks the apomorphic presence of an elongate propodeum (which in the aforementioned three genera is as long as or longer than the combined lengths of the mesoscutellum and metanotum) as well as the expanded pronotal dorsal surface or other modifications (*e.g.*, the densely pectinate inner metatibial spur of *Ischnomelissa* species).

The new genus is most closely allied to, and perhaps even sister to, *Chlerogas* but is generally plesiomorphic with respect to the latter. It seems most appropriate to establish this new genus rather than attempting to expand the definition of *Chlerogas* to include the species since the synapomorphies presently employed to define the latter group are distinctive and of biological interest making it a meaningful classificatory entity on its own (Engel, 1998, 2000; Brooks & Engel, 1999). Combining the two would greatly weaken the definition of *Chlerogas* as we presently understand it. It is hoped that the future discovery of the male for the new genus will shed considerable light on its phylogenetic position and clarify its validity. While *Chlerogas* appears to be the most likely relative of this new genus, another alternative would be near *Megaloptilla* and *Paraoxystoglossa* (which themselves should perhaps be united as subgenera of a single genus). It is imperative that the male of *Rhynchochlora* be discovered so as to more accurately determine where this enigmatic bee belongs among other genera of the subtribe Augochlorina.

Rhynchochlora chlerogopsis Engel sp. n.
(Figs. 3–5)

Holotypus: ♀, labeled: Ecuador, Pichincha, Nambillo Valley near Mindo, 26.VI.1987, 1450m, M. Cooper, ex: primary forest // Holotype, *Rhynchochlora chlerogopsis*, Michael S. Engel [red label]. Deposited in the Natural History Museum, London.

Diagnosis: As for the genus (*vide supra*).

Description: ♀: As for the genus, with the following additions: Total body length 10.0 mm; forewing length 7.8 mm. Head longer than wide (length 2.7 mm, width 2.3 mm), clypeus entirely below lower tangent of compound eyes. Intertegular distance 1.8 mm. Forewing basal vein distad cu-a by twice vein width; 1m-cu confluent with 1rs-m; 2m-cu basad 2rs-m by 6 times vein width; first submarginal cell about as long as combined lengths of second and third submarginal cells; second submarginal cell roughly rectangular; anterior border of second submarginal cell very slightly shorter than anterior border of third submarginal cell; anterior border of third submarginal cell about two-third length of posterior border.

Clypeus and supraclypeal area finely imbricate, with scattered, faint punctures; remainder of head imbricate and granulose. Pronotum and mesoscutum imbricate and granulose; pleura sculptured as on mesoscutum except more strongly granulose; mesoscutellum and metanotum imbricate, with scattered, faint, minute punctures. Metasoma finely imbricate.

Head dark metallic green, with strong coppery highlights; mandible amber, with reddish-brown apex; apical third of clypeus amber; labrum amber; labiomaxillary complex brown, glossa yellow; scape and ventral surfaces of pedicel and flagellum amber, dorsal surfaces of pedicel and flagellum brown. Mesosoma dark metallic green (slightly darker than head), with coppery highlights except amber on tegula, mesoscutellum, metanotum, propodeum, pronotum (except brown patches on lateral surface anterior to pronotal lobe), and ventral half of metepisternum. Wing veins brown, becoming yellowish beyond prestigma; membrane lightly infusate. Legs amber. Metasoma amber.

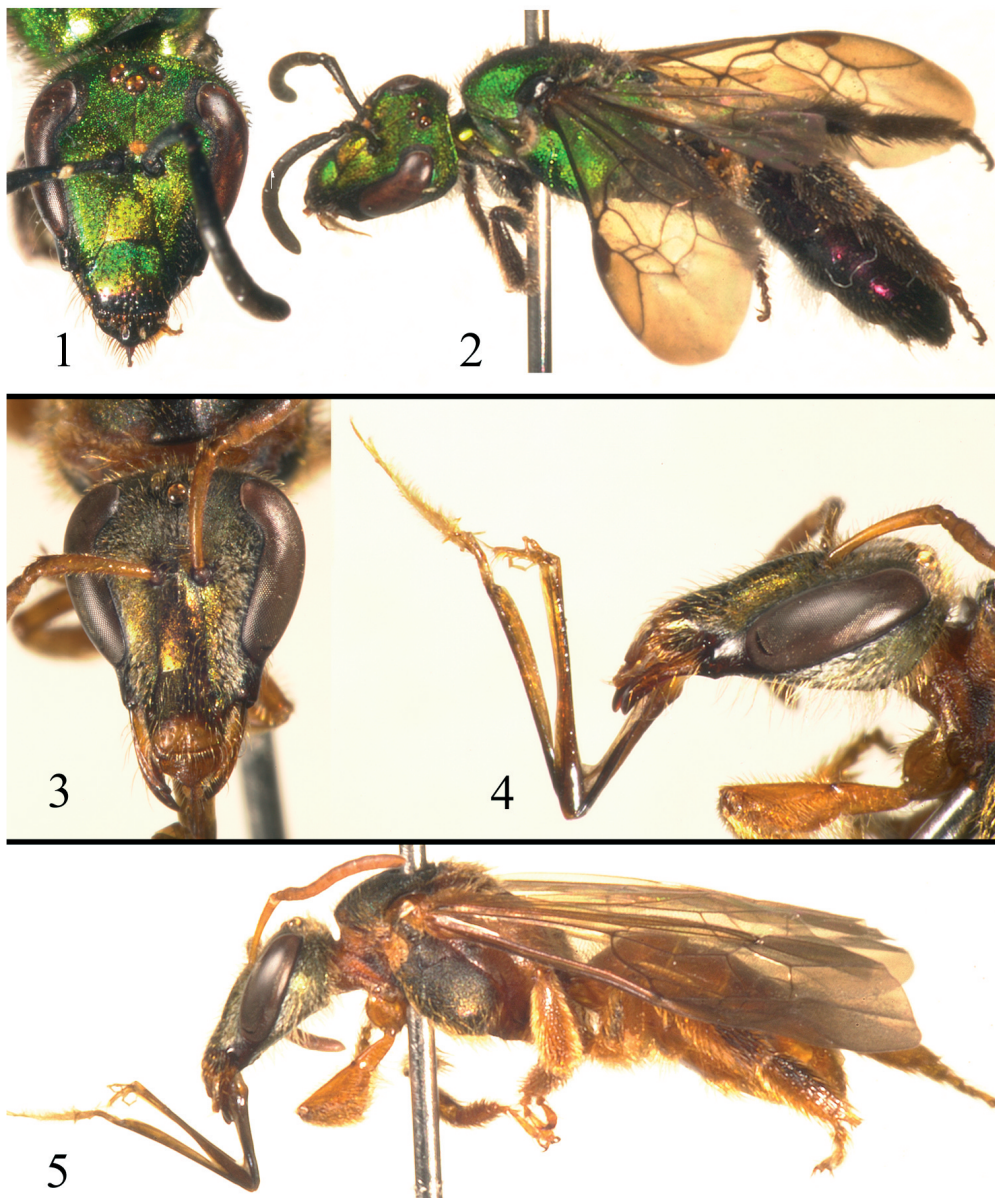
Pubescence generally golden except those setae of outer surfaces of metatibia and metabasitarsus (basal half) black and scopa largely composed of black, plumose setae overlaid by a row of golden, plumose setae; inner surface of metatibia with dense, pale yellow, palmate setae.

♂: Unknown.

Derivatio nominis: The specific epithet is a reference to the similarity of this bee to species of the genus *Chlerogas*. The epithet is a combination of *Chlerogas* and the suffix *-opsis* (Greek, meaning “having the appearance of”).

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Figs. 1–5: New augochlorine bees from Ecuador. 1) *Caenaugochlora silvicola* Engel sp. n., facial view of holotype; 2) *C. silvicola* Engel sp. n., lateral aspect of holotype; 3) *Rhynchochlora chlerogopsis* Engel gen. et sp. n., facial view of holotype; 4) *R. chlerogopsis* Engel gen. et sp. n., lateral view of head; 5) *R. chlerogopsis* Engel gen. et sp. n., lateral aspect of holotype.

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Savo Brelih (na sredini) ob akademiku prof. dr. Matiju Gogala, ki bo letos dopolnil sedemdeset let, in šestdesetletniku dr. Nacetu (Ignacu) Sivcu. Foto Ciril Mlinar.