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# A new species of *Neocorynura* from Ecuador (Hymenoptera: Halictidae), with notes on taxonomy of the genus

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## Abstract

A new species of the Neotropical bee genus *Neocorynura* (Halictinae: Augochlorini) is described and figured. *Neocorynura miae*, new species, combines characters traditionally used to distinguish *Neocorynura* from its relative *Andinaugochlora* (sensu Michener, 2000). The taxonomic placement of *N. miae* in the genus is presented and a revised diagnosis of *Neocorynura* is provided.

**Key words:** Apoidea, Augochlorini, Phylogeny, Bee, Colombia

## Resumen

Se describe una especie nueva de abeja del género Neotropical *Neocorynura* (Halictinae: Augochlorini). *Neocorynura miae*, especie nueva, combina caracteres usados tradicionalmente para distinguir *Neocorynura* del genero cercano *Andinaugochlora* (sensu Michener, 2000). Se presenta la ubicación taxonómica de *N. miae* en el género, así como una diagnosis revisada de *Neocorynura*.

**Palabras clave:** Apoidea, Augochlorini, filogenia, abeja

## INTRODUCTION

The bee genus *Neocorynura* Schrottky is one of the largest genera in the bee tribe Augochlorini (Halictidae: Halictinae) with approximately 60 to 65 described species (Eickwort 1969, Moure and Hurd 1987, Engel 1999, Engel 2000, Michener 2000), and an equal number of undescribed species (Smith-Pardo, unpubl.data). It ranges from northern Argentina to Mexico (Eickwort 1969, Engel 2000, Michener 2000). There are no comprehensive studies of the genus or its diversity, but preliminary data suggest a larger

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number of species of *Neocorynura* in northern South America, especially Colombia, Ecuador, and Perú (Smith-Pardo, unpublished data). This is perhaps partially a result of the fact that *Neocorynura* is one of the few bee genera that reach high altitudes in the Andes (Gonzalez and Engel 2004).

There is no clear consensus on the limits of the genus, and its definition varies according to the authority. In addition, several phylogenetic analyses of the tribe Augochlorini (Eickwort 1969, Engel 2000, Danforth 2002) have had difficulty establishing the monophyly of *Neocorynura*.

## MATERIAL AND METHODS

Morphological observations, measurements, and illustrations were made using an Olympus SZ60 microscope fitted with an ocular micrometer. The abbreviations F, S, T, OD, and PD are used for flagellomere, metasomal sternum, metasomal tergum, ocellar diameter, and puncture diameter, respectively. Morphological terminology follows that of Michener (2000) and Engel (2001), while Harris (1979) is used for surface sculpturing. The description follows the format used for other augochlorine bees (e.g., Engel 1999, 2000; Engel and Smith-Pardo 2004).

The redefinition of the genus presented here is based on a comprehensive study on the evolutionary relationships among the species of *Neocorynura* (Smith-Pardo, in prep.).

The specimens used for this study are deposited in the following institutions:

**AMNH** American Museum of Natural History, New York (J. G. Rozen, Jr., Valerie Giles);
**SEMC** Entomology Division, Natural History Museum, University of Kansas, Lawrence (M. S. Engel, Z. H. Falin).

## SYSTEMATICS

### Genus *Neocorynura* Schrottky

*Cacosoma* Smith, 1879: 39. Type species: *Cacosoma discolor* Smith, 1879, by subsequent designation of Sandhouse (1943). Preoccupied.

*Neocorynura* Schrottky, 1910: 540. Replacement name for *Cacosoma* Smith, 1879. Engel, 2000: 45. Michener, 2000: 393.

*Neocorynura* (*Neocorynuroides*) Eickwort, 1969: 404. Type species: *Halictus rhytis* Vachal, 1904, by original designation and monotypy. Engel, 2000: 45 [as synonym of *Neocorynura*]. Michener, 2000: 393. [as synonym of *Neocorynura*].

*Andinaugochlora* Eickwort, 1969: 407. Type species: *Andinaugochlora micheneri* Eickwort, 1969, by original designation and monotypy. Engel, 2000: 29. Michener, 2000:384. **N. syn.**

*Neocorynurella* Engel in Engel and Klein, 1997: 156. Type species: *Neocorynurella seeleyi* Engel

  

and Klein, 1997, by original designation. Engel, 2000: 46. Michener, 2000: 384. [as subgenus of *Andinaugochlora*]. **N. syn.**

*Vachalius* Moure, 1999: 74. Type species: *Halictus cosmetor* Vachal, 1911, by original designation and monotypy. Engel, 2000: 46 [as synonym of *Neocorynurella*]. **N. syn.**

Previous authors recognized the genus using the combination of the following homoplasious characters: preoccipital carina present, paraocular angle obtuse (absent), anterior border of mesoscutum often narrowed, and inner metatibial spur pectinate. The genus as understood herein, includes species that do not agree with this combination of characters, some of which have the preoccipital carina absent/faint to strongly carinate/ lamellate, paraocular angle variable from obtuse (absent) to forming a right angle, and inner metatibial spur pectinate but variable in shape and number of teeth.

*Diagnosis*

The genus *Neocorynura* in the present sense is well supported by the following putative synapomorphies and by the combination of some additional characters.

The synapomorphies for the genus include: a labral process on anterior margin , metabasitibial plate elongated, sometimes covered with setae; and the pores on the surface of the galea uniformly distributed.

Some other characters that in combination help in recognizing the genus include, in the females: integument of interantennal area imbricate and punctate, second submarginal cell wider than long, mandible mostly dark, sometimes with clear apex, mesotibial spur almost straight, first labial palpomere as long as the combined lengths of the following two, and glossa elongate and narrowly pointed. In males: dorsal surface of volsella acute or with hump, pores on S5 uniformly distributed across entire surface, and the posterior margin of T6 rounded.

*Comments*

The unification of *Neocorynura* and *Andinaugochlora* (senso Michener 2000) results in the following new combinations:

1. “seeleyi species group” (= former *Neocorynurella*)
   *Neocorynura seeleyi* (Engel and Klein), new combination
   *Neocorynura viridis* (Engel and Klein), new combination

2. “joannisi species group” (= former *Andinaugochlora* s.str.)
   *Neocorynura micheneri* (Eickwort), new combination
   *Neocorynura joannisi* (Vachal), new combination

3. Presently not placed as to species group (these will be treated in Smith-Pardo, in prep.)
   *Neocorynura cosmetor* (Vachal), new combination (= former *Neocorynurella* in part)

  

*Neocorynura centralpina* Engel & Smith-Pardo, new combination (= former *Andinaugochlora* in part)

Definitions of species groups across *Neocorynura* diversity will be presented in a forthcoming contribution (Smith-Pardo, in prep.).

The unification of these genera requires some minor modifications to the generic keys provided by Engel (2000) and Michener (2000). These alterations are as follows: In Engels (2000) key to females the first half of couplet 24 should read *Neocorynura* (changed from *Andinaugochlora*), couplet 26 can be removed entirely, and the second half of couplet 30 should read *Neocorynura* (changed from *Neocorynurella*). In Engels (2000) key to males the first half of couplet 27 should read *Neocorynura* (changed from *Andinaugochlora* and *Neocorynurella*), and couplet 28 can be removed entirely. In Micheners (2000) key to females the first half of couplet 23 should read *Neocorynura* (*N. joannisi* species group), and the second half of couplet 27 should read *Neocorynura* (*N. seeleyi* species group). In Micheners (2000) key to males the second half of couplet 21 should read *Neocorynura* (*N. seeleyi* species group), and the first part of couplet 25 should read *Neocorynura* (*N. joannisi* species group).

***Neocorynura miae* sp. nov.**
(Figs. 1, 2)

*Diagnosis*

*Neocorynura miae* is most similar to the *N. seeleyi* species group in overall appearance: robust, very setose; the shape of inner metatibial spur (serrate-pectinate), and in having a well-defined metabasitibial plate covered with some coarse setae. It differs from them in having a protuberant, rounded medial process of the labrum that covers most of its apex; the paraocular lobe angular; the presence of a postoccipital carina; and in having a single row of coarse setae on the metabasitibial plate. *Neocorynura miae* also looks similar to the other species groups of *Neocorynura*, but it can be separated from them by the shape of the labral process, the shape of the metabasitibial plate, and by the form of the inner metatibial spur.

*Description*

**Female** (Holotype). Body length 12.5 mm; forewing length 11.5 mm. Head width 3.5 mm, length 3.2 mm. Scape longer than combined lengths of F1 to F6; F10 longer than preceding flagellomeres; F1 slightly longer than F2. Clypeus 1.5 times wider than long; paraocular lobe obtuse semi-angular. Mesoscutum wider than long; metanotum more than half-length of mesoscutellum. Mesotibial spur serrate and more than half length of mesobasitarsus; inner metatibial spur serrate-pectinate with more than 6 teeth, last two (apical process and subapical tooth) almost completely fused. Marginal cell elongate,

  

almost as long as length of three submarginal cells together; 1m-cu not confluent with 1rs-m; 2m-cu basad 2rs-m by more than 6 times vein width; first submarginal cell longer than combined lengths of second and third submarginal cells together; second submarginal cell rectangular; anterior border of third submarginal cell longer than anterior border of second submarginal cell; pterostigma large, narrow (sides almost completely parallel), and with margin in marginal cell convex; hamuli spaced 3-1-1-2. Basal area of propodeum strongly imbricate and shorter than mesoscutellum. T1 semi-petiolate (slightly longer than wide).


**FIGURE 1.** Lateral habitus of *Neocorynura miae* sp. nov. **a.** female, **b.** male.

  

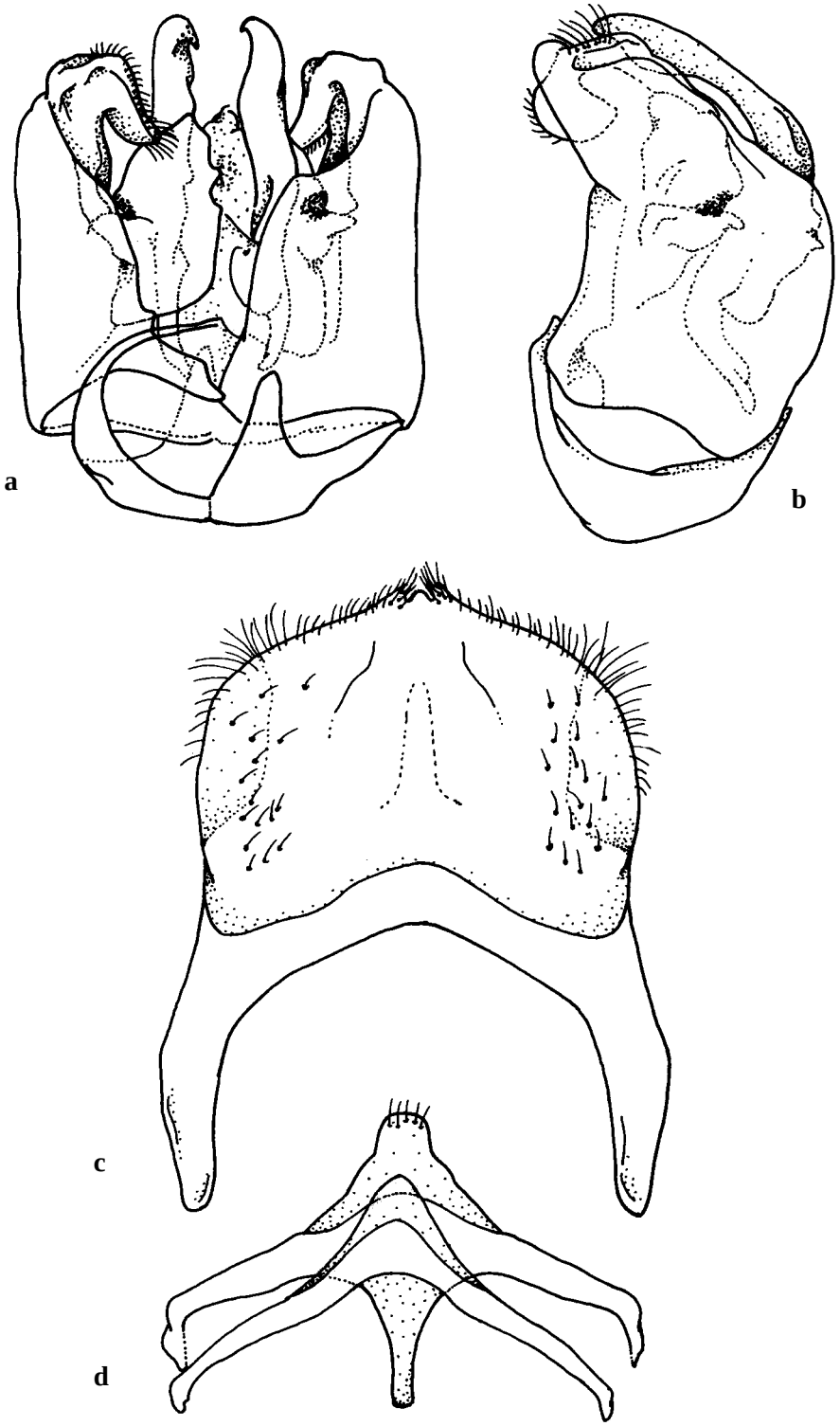


**FIGURE 2.** Male terminalia of *Neocorynura miae* sp. nov. **a:** genital capsule: ventral (left half) and dorsal (right half), **b:** genital capsule lateral view, ventral to the left, **c:** S6, and **d:** fused S7+S8.

  

Labrum slightly striate, with broad circular, mid-apical central process. Clypeus with punctures uniformly separated by 1 PD; supraclypeal area and rest of face imbricate, punctures similar to those on clypeus, except on frons and vertex, where punctures are smaller and denser; gena and postgena smooth with small, faint punctures and striate. Scape imbricate, with minute punctures separated by more than 1 PD. Pronotum mostly smooth or faintly imbricate. Mesoscutum imbricate to slightly imbricate with punctures broadly separated medially and dense laterally; mesoscutellum smooth but punctate along borders, punctures of different diameters. Metanotum not imbricate, densely punctate, punctures small. Pleura imbricate with punctures broadly separated (> 2 PD). Tegula faintly imbricate medially. Basal area of propodeum uniformly imbricate, not striate.

Mandible dark brown, apex clear. Labrum black; lower half of clypeus black, remainder of clypeal surface metallic green; remainder of head metallic green (yellowish along ocular margins). Mesosoma metallic green, except reddish brown between insertion of mid- and hind legs. Legs mostly brown except metatarsi light brown. Metasoma mostly dark brown, except basal third of each tergum metallic green.

Mandible with brown, unbranched setae, 0.5–2.5 OD in length, mostly on grooves. Labrum mostly bare with a row of coarse, brown, unbranched setae along anterior margin. Clypeus with a row of coarse, light brown, and unbranched setae along articulation with labrum, with thinner, branched setae, 1–2 OD in length, sparsely distributed over surface. Supraclypeal area as on clypeus, except setae shorter (0.5–1.5 OD); subantennal area and frons with black or brown, branched setae more densely distributed, minute-3 OD in length (smaller ones along paraocular margins). Scape with light brown, mostly branched setae, minute-1.5 OD in length, longer ones on base of scape. Vertex as on frons, except for some minute, white, and branched setae scattered among larger ones; gena and postgena as on vertex, except for some longer (3 OD) setae close to mandibular insertion. Pronotum densely covered with minute, whitish setae with some branched and longer setae (1–1.5 OD in length) on pronotal lobe. Mesoscutum with dark brown to black, branched setae more or less densely distributed and 0.5–2 OD in length. Mesoscutellum as mesoscutum, except for some coarse, black, branched setae, 0.5–2.5 OD in length, sparsely distributed. Metanotum more densely covered with white, branched setae, minute to 1.5 OD in length. Base of propodeum essentially bare, remainder of surface with light brown, branched setae, sparsely distributed but with some minute setae close to metapleuron. Mesepisternum like posterior surface of propodeum, except without minute setae; metepisternum like preepisternum but with minute, dense setae mostly close to leg insertion. Procoxa with coarse, light brown setae, poorly branched, and 1–1.5 OD in length, scattered among minute ones; protrochanter like procoxa but setae longer (some as long as 2 OD) and more branched, mostly along posterior margin; profemur like protrochanter, except with inner surface more sparsely covered with minute setae; protibia with outer side mostly covered with light brown, unbranched setae, minute to1 OD, dense, inner surface with darker branched setae; tarsi as on protibia; mesocoxa covered with light

brown, basally branched setae, mostly close to articulation with mesotrochanter; mesotrochanter with light brown, branched setae, 0.5–2 OD in length and sparsely distributed; mesofemur on inner side with coarse, light brown setae, 0.5 OD in length and dense on anterior angle and forming a patch, rest of surface with light brown, poorly branched setae, minute-1.5 OD in length, sparsely distributed mostly on outer side; mesotibia as protibia, except setae on outer side darker and branched; mesotarsus as for protarsus; metacoxa as for procoxa, except setae more abundant; metatrochanter with light brown, branched setae, 2–2.5 OD in length, mostly on ventral side; metafemur as on metatibia except setae longer (3–3.5 OD in length), mostly basally, bending and forming scopa, setae close to articulation with metatibia smaller and minutely branched; metatibia covered with coarse, dark to light brown setae, those on anterior margin branched and 1–1.5 OD in length, remainder of surface with coarse, dark brown, denser and unbranched setae. T1 with light brown, branched setae, 1–2.5 OD in length and sparsely distributed; T2 and T3 sparsely covered with dark brown, unbranched, minute to1 OD in length, with some light brown, branched setae on sides; T4 as T2 and T3 except, darker setae longer (2–2.5 OD); T5 more densely covered with coarse, dark brown, branched setae, minute to 2.5 OD in length.

**Male.** As described for the female except as follows: Body length 12 mm; forewing length 9.7 mm. Head width 3.0 mm, length 2.9 mm. F2 longer than F1. Mandible slender and pointed, without preapical tooth. Clypeus longer (less than 1.5 times wider than long). Mesoscutum slightly wider than long. Metabasitibial plate absent; inner metatibial spur one-fourth length of metabasitarsus, rather slender and serrated. Metasoma with more elongate appearance; S6, S7, S8, and genital capsule as in fig. 2.

Mandible without grooves on outer surface, slightly carinate along posterior margin. Subantennal and lower paraocular areas with well defined, densely distributed punctures. Mesoscutellum slightly imbricate with punctures uniformly distributed.
Clypeus uniformly metallic green. Tegula metallic on anterior end. Legs (except tarsi) dull metallic green. Metasomal T1 to T4 with basal thirds metallic green; T5 completely metallic.

Pubescence of head similar to that of female, except setae on gena and postgena longer (minute to 3.5 OD in length). Metanotum in general with longer setae, sparsely distributed. Legs (particularly hind ones) in general less pubescent; procoxa more densely covered with white, branched setae, 1–3 OD in length; profemur with white setae, 0.5–1 OD in length on posterior margin; protibia with unbranched setae, less densely distributed; mesofemur with most of inner surface bare and without patch of setae; metatrochanter poorly covered with setae, most of them unbranched; metafemur poorly covered on outer surface, inner surface with keirotrichia white and minute. Metasomal pubescence as in the female except for basal bands of white, minute setae on T2 to T4; setae more scattered on S1 to S3.

  

Type material

HOLOTYPE. ♀, **ECUADOR**. ***Azuay Province,*** *Santa Isabel*, 65 km SW Cuenca. III-10–13-1965. Luis Peña Coll. (AMNH). [Approximate coordinates: Long: -79.3167, Lat: -03.3333].

PARATYPES. Same data as holotype [2♀ 8♂ AMNH, 1♀ 1♂ SEMC].

*Etymology*

The specific epithet is a dedication to my wife, Miae Won, for all her love and support.

*Variation*

There is some variation in overall body size (11–14 mm); the apex of the marginal cell in some specimens is pointed; in addition, female specimens differ to some extent in the following characters: metallic coloration of mesoscutum sometimes dark medially and bright elsewhere, and extent of metallic coloration on basal areas of T2 and T3 from one-third to almost half of each tergal surface.

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This work is dedicated to the people of Colombia and their hope for a peaceful country. I would like to thank Charles D. Michener and Michael S. Engel for their comments and suggestions on earlier versions of the manuscript, and the curators, collection managers, and research assistants of the various institutions loaning material. Daniel J. Bennett commented on the manuscript and took the photographs presented herein. This paper is a contribution of the Division of Entomology, Natural History Museum and Biodiversity Research Center, University of Kansas.

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