

## ***Euglossa natesi* n. sp., a new species of orchid bee from the Chocó region of Colombia and Ecuador (Hymenoptera: Apidae)**

ALEJANDRO PARRA-H<sup>1</sup>, RODULFO OSPINA-TORRES<sup>2</sup>, SANTIAGO RAMÍREZ<sup>3</sup>

<sup>1</sup>Laboratorio de Investigaciones en Abejas LABUN, Departamento de Biología, Universidad Nacional de Colombia, sede Bogotá. E-mail: varnishpt@yahoo.com

<sup>2</sup>Departamento de Biología, Universidad Nacional de Colombia, sede Bogotá. E-mail: rospinat@unal.edu.co

<sup>3</sup>Museum of Comparative Zoology and Department of Organismic and Evolutionary Biology, Harvard University, 26 Oxford St., Cambridge, MA 02138. E-mail: sramirez@oeb.harvard.edu

### **Abstract**

A new species of orchid bee in the genus *Euglossa* is here described. *Euglossa natesi* n. sp. Parra-H, Ospina-Torres & Ramírez has been collected from the Pacific Andean foothills of Colombia and Ecuador. *Euglossa natesi* n. sp. has no obvious close relatives, and while most morphological characters suggest that it belongs to the subgenus *Glossura*, a few characters indicate that it belongs to the subgenus *Glossurella*.

**Key words:** Orchid bee, Euglossini, Colombia, Ecuador, Andes, Chocó Region, endemism, *Euglossa*, *Glossura*, *Glossurella*, genitalia

### **Introduction**

Orchid bees abound in the lowland wet forests of the Neotropical Region, although a few species also occur in dry, open habitats (Ramírez *et al.* 2002, Roubik & Hanson 2004). Of the five genera that comprise the orchid bee tribe Euglossini, *Euglossa* Latreille 1802 is the most species-rich, with more than 110 described species. The genus *Euglossa* is commonly subdivided into six subgenera (*Dasytilbe*, *Euglossa* s.str., *Euglossella*, *Glossura*, *Glossurella* and *Glossuropoda*), as originally proposed by Dressler (1978) and Moure (1989). However, this classification scheme was rejected by Michener (2000) on the basis of little morphological discontinuity between the groups.

While most of the taxonomic characters typically used to diagnose species are unique to males (Dressler 1978, Bonilla-Gomez & Nates-Parra 1992), conspecific males and females do show similar coloration, punctation, size and form. Male-specific characters

are useful for defining subgenera (Dressler 1978, Moure 1989), as well as for separating sibling taxa (Roubik 2004, Rasmussen & Skov 2006). The most frequently used include the velvety area and hair tufts of the midtibia, the shape of the hind tibia, the facial markings, and integument punctation and coloration (Dressler 1978, Dressler 1982, Bonilla-Gomez & Nates-Parra 1992, Roubik 2004, Ramírez 2005). Until recently, however, little attention has been paid to the male genitalia as a source of informative diagnostic characters (*e.g.* Bembé 2004, Rasmussen & Skov 2006, Ramírez *in press*). Nevertheless, male genitalia appear to provide numerous informative characters that can be used in defining subgenera and species groups (Ospina-Torres, Parra-H & González *In prep*).

In the present work, we describe a distinct new species, *Euglossa natesi* **n. sp.**, collected in the poorly studied Andean forests of the Chocó Region of Colombia and Ecuador. On the basis of both external morphology and genitalia, we discuss its possible relationship to other members of the genus.

### Materials and methods

A total of 10 individuals of *Euglossa natesi* **n. sp.** were examined for the present work. Specimens were collected during a recent survey of primary forest in the department of Nariño (Colombia), or found undescribed in museum collections. Two of the four specimens found in museum collections were previously identified by R. L. Dressler as a new taxon (provisionally named *Euglossa amoena*, **nomen nudum**), while the other two were discovered misidentified as *Euglossa ignita* Smith 1874 in the FLAS collection (see below). This new species is only known from males, as all specimens were collected in traps baited with chemicals (see Roubik & Hanson 2004 for methods).

We followed Ramírez (2005) for descriptions of integumental coloration and measurements of specimens. Museum acronyms are as follows: University of Florida Herbarium (FLAS), Museum of Comparative Zoology, Harvard University (MCZ), Division of Entomology, Natural History Museum, Kansas University (KU), Laboratorio de Investigaciones en Abejas, Universidad Nacional de Colombia (LABUN).

### Species description

#### *Euglossa (Glossura) natesi*, **n. sp.** Parra-H, Ospina-Torres & Ramírez

Syn. *Euglossa amoena* Dressler, **Nomen nudum**

Males only, females unknown.

*Diagnosis.* Separated from other members of the genus by the combination of tongue

length (twice body size), sternum 2 with no tufts or depressions, blue-green scutum and bronze metasoma.

*Dimensions.* Total length 16.88 mm (16.00–18.00); head width 5.95 mm (5.88–6.00); intertegular span 4.18 mm (3.90–4.40); abdominal width 5.40 mm (5.06–5.80); tongue in repose exceeding twice body length.

*Head.* Mandibles bidentate; labrum longer than wide, with well-defined median keel, two weak lateral keels and two translucent spots; side of clypeus and paraocular area blue-green; clypeus dark blue-green; lateral margins of clypeus dark maroon, medial ridge black (Fig. 3); clypeus prominent, with pronounced medial keel and two less prominent lateral keels; paraocular markings dirty white, narrow above, broader below (Figs. 1, 3); antennal scape black; upper frons blue. Tongue in repose about twice body length, 28.35 mm (27.75–30.55); clypeus length 1.86 mm (1.58–1.92), clypeus width 2.11 mm (2.00–2.42); clypeocular distance 0.18 mm (0.16–0.21); head length 2.73 mm (2.58–3.00); head width 5.95 mm (5.90–6.00); eye length 3.77 mm (3.63–3.83); lower interocular distance 3.04 mm (2.96–3.08); upper interocular distance 2.36 mm (2.25–2.60); antennocular distance 0.56 mm (0.50–0.58); upper interantennal distance 1.45 mm (1.30–1.58); antennocellar distance 1.23 mm (1.13–1.25); interocellar distance 0.24 mm (0.21–0.29); ocellocular distance 0.71 mm (0.67–0.75).

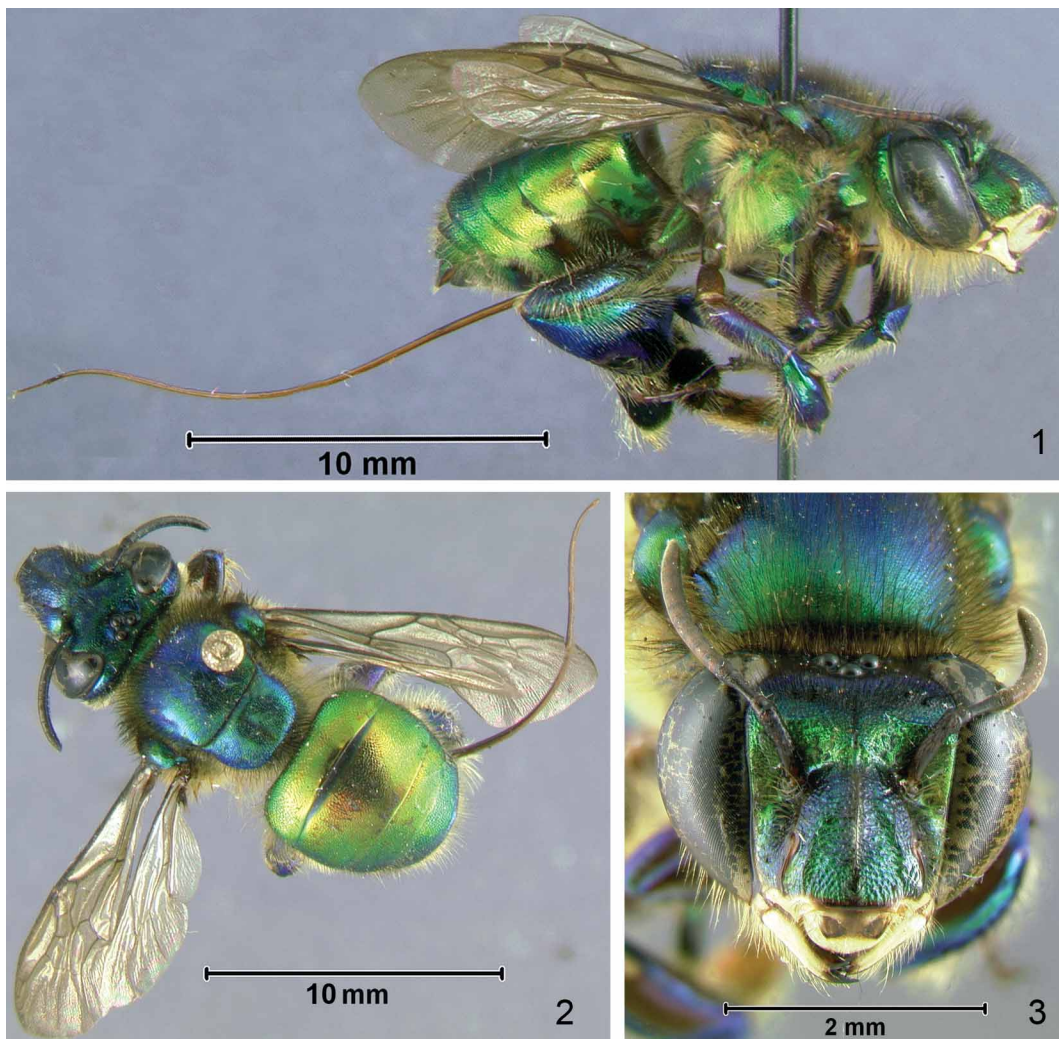
*Mesosoma and metasoma.* Mesoscutum and scutellum blue-green; mesepisternum green; abdomen golden bronze (Fig. 1, 2). Scutellum rounded on posterior margin, about half as long as wide, with strong median depression (Fig. 2); sternum 2 without tufts or depressions; total body length 16.88 mm (16.00–18.00); mesoscutum width at anterior end of tegulae 4.10 mm (3.90–4.40); metasoma width 5.40 mm (5.06–5.80). Hind tibia blue-green. Posterior tuft of midtibia lacking, anterior tuft oblong, shorter than width of velvet area (Figs. 4, 5); velvet area of midtibia wide, tapering below; midtibia with acute apical process (Fig. 5); midtibial spur serrate; hind tibia triangular, narrow, about half as wide as long. Midtibia length 3.31 mm (3.17–3.50); midtibia width 1.34 mm (1.31–1.38); midbasitarsus length 2.93 mm (2.79–3.00); midbasitarsus width 0.84 mm (0.79–0.88); hind tibia length 5.38 mm (5.17–5.58); hind tibia width 2.76 mm (2.67–2.83). Wing venation dark brown; wing membrane light brown. Jugal comb at base of hind wing with 12–14 blades.

*Pilosity.* Unbranched, black, long (~0.5 mm) sparse setae on vertex; branched, yellow, short (~0.2 mm) setae mixed with unbranched, black, long (~0.4 mm) setae on mesoscutum; unbranched, black, long (~0.4 mm) setae on scutellum; dense, branched, yellow, long (~0.7 mm) setae on mesepisternum and genal area.

*Punctuation.* Disc of clypeus with coarse, shallow punctation; mesepisternum shallowly punctate, almost mirror-like; mesoscutum with fine, sparse punctation, interspaces about 3 times width of punctures; scutellum covered by shallow, sparse punctation; terga 1–4 with shallow, sparse, irregularly shaped punctures with thin band of fine, dense, symmetrical punctures on posterior margin; terga 5–6 with coarse, shallow

punctures; basal end of hind tibia with shallow, irregularly shaped punctures.

*Genitalia and hidden metasomal sterna.* Line drawings of sterna 7, 8 and the genital capsule are provided in Figures 6–9. Sternum 7 with small lobes (Fig. 6), with setal patches on each end (not shown in Fig. 6); sternum 8 with strongly curved apical process, spiculum pronounced in lateral view (Fig. 7). Gonocoxite lobes of genitalia rounded, notched at base (Fig. 8); penis valve extending slightly beyond gonostylar setae; dorsal bridge of penis valve (*dbpv*) curved, with pronounced horn-like processes (Fig. 8). Gonostylus with two lobes (Fig. 9): lower lobe long, digitiform, with thick, short, unbranched setae; upper lobe rounded with thick, long, unbranched setae.



**FIGURES 1–3.** *Euglossa natesi* n. sp.. Lateral view (1), dorsal view (2) and frontal view (2).

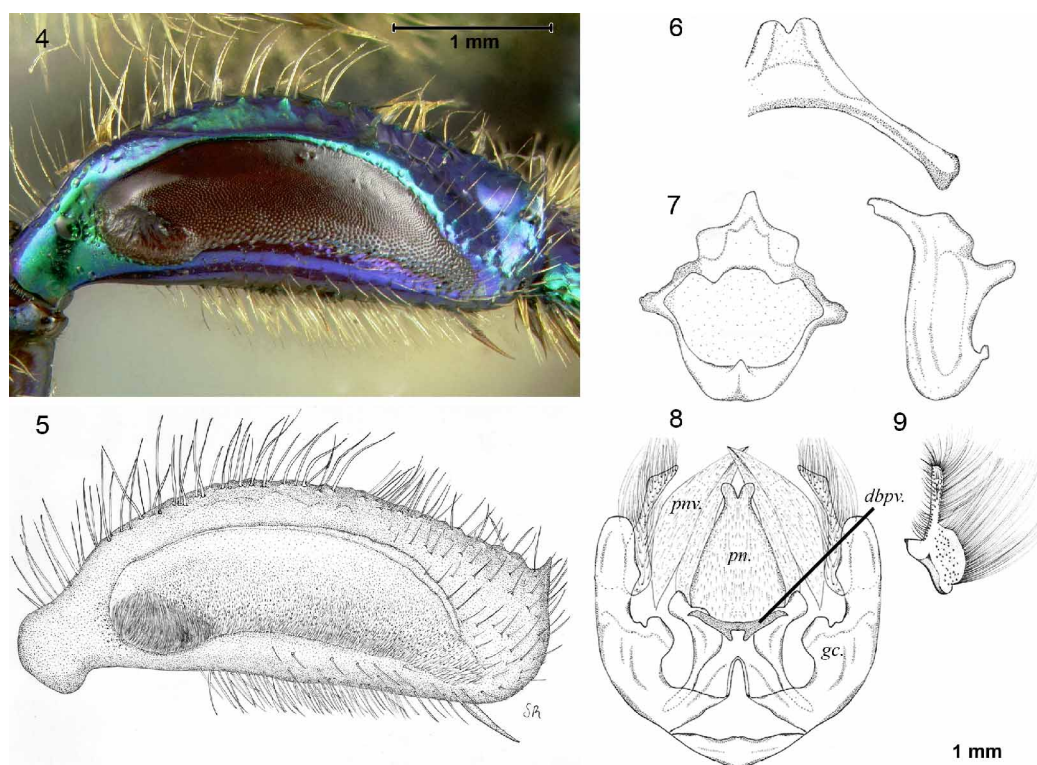
*Variation.* Based on a sample size of 10 individuals, low variation (<10%) was found in most of the characters examined here, apart from clypeus length (10.54%), interocellar

distance (13.79%), malar area (19.86%), and the coloration of the facial markings, which range from ivory white to light brown.

*Etymology.* The epithet *natesi* honors professor Guiomar Nates-Parra, from the Universidad Nacional de Colombia, who founded the Laboratorio de Investigaciones en Abejas (LABUN) and pioneered research on Colombian bees.

*Holotype.* COLOMBIA: Nariño, Municipality of Barbacoas, Altaquer, La Tajada. April 7 2005, 960 m, collected by Alejandro Parra-H in trap baited with cineole, male (deposited in LABUN).

*Paratypes.* COLOMBIA: Antioquia, Urrao, La Clara, 1270 m., 8 Nov. 1982, J. P. Folsom B58C (Dressler coll.), 1 male, (deposited in MCZ). Valle, Rio Anchicayá, 400 m, IX-28-1976, Bell, Breed & Michener, male, (deposited in KU). Nariño, Municipality Barbacoas, Altaquer, La Tajada, 960 m, five males collected in traps baited with Cineole and Eugenol, collected by Victor Solarte, (deposited LABUN). ECUADOR: Esmeraldas, km 17 Lita-Alto Tambo, 730 m 18 Jan. 1990, collected in traps baited with cineole by M. Whitten, 2 males labeled 122 and 123 (deposited in FLAS).



**FIGURES 4–9.** *Euglossa natesi* n. sp. Middle tibia (4) of male with its corresponding line drawing (5); hidden male sternite 7 (6) and 8 in lateral and ventral views (7) male genitalia capsule (8) (*dbpv.*: dorsal bridge of penis valve, *gc.*: gonocoxite, *pn.*: penis, *pnv.*: penis valve) and gonostylus (9) in lateral view.



**FIGURE 10.** Map of the Andean region showing collection localities of *Euglossa natesi* **n. sp.**

## Discussion

*Euglossa natesi* **n. sp.** is a distinctive bee, with no obvious close relatives as inferred from morphological similarity. The shape of the hind tibia, tongue length, body size, medial depression of the scutellum, shape of the gonostylus, and long gonostylar setae all suggest that this new taxon belongs to the subgenus *Glossura* (Roubik 2004, Ospina-Torres, Parra-H & González *In prep*). However, the lack of an anterior tuft in the midtibia and the absence of cowls on sternum 2 suggest that *E. natesi* **n. sp.** belongs to the subgenus *Glossurella*. This contradictory combination of characters in a single species is remarkable, and so far is unique among members of these two subgenera (Dressler 1978, 1982, Roubik 2004). In fact, this combination of characters may indicate that *Glossura* and *Glossurella* are not monophyletic as currently defined. Nevertheless, without additional data, the majority of characters favor *Glossura*, and thus we have tentatively placed *E. natesi* **n. sp.** in this subgenus.

We report *Euglossa natesi* **n. sp.** from four distant localities along the western flank of the Andean Cordillera (Fig. 10). Although much of the orchid bee fauna along the Colombian Cordilleras remains to be studied, ongoing year-round sampling by of one us (SR) at various localities on both the Central and Eastern Colombian Andes has not yielded any specimens of *E. natesi* **n. sp.** These observations in conjunction with previous

evidence indicating that the Chocó Region constitutes an isolated biogeographic unit (e.g. Hackett 1996), suggest that *E. natesi* n. sp. may be an endemic species of the lowland Pacific flank of the Andes.

### Acknowledgements

We thank Robert L. Dressler for kindly providing specimens of *E. natesi* n. sp. as well as comments on its description. Zachary H. Falin and Ismael Hinojosa-Dias (KU) facilitated access to specimens. SR was supported by grants from the Putnam Expedition Fund (Museum of Comparative Zoology), the Colombia Biodiversa Fund (Fundación Alejandro Escobar), the David Rockefeller Center for Latin American Studies (Harvard) and the National Science Foundation (NSF-DIG, DEB# 0608409). ROT was supported by the Research Division of Bogotá (DIB, Universidad Nacional de Colombia) for the research project “The bees of a primary forest of the Chocó Region”. We thank A. Víctor Manuel Solarte and the staff members of the Natural Reserve Río Ñambí and the Fundación Ecológica Los Colibríes de Altaquer (FELCA) of Pasto for assistance during field work. Gary Alpert allowed me to use his digital photography equipment for the Auto-Montage work. Comments by Beth Pringle, Naomi Pierce and two anonymous reviewers improved the manuscript.

### References

- Bembé, B. (2004). Revision der *Euglossa cordata*-Gruppe und untersuchungen zur funktionsmorphologie und faunistik der Euglossini (Hymenoptera, Apidae). Dissertation zur Erlangung des Doktorgrades an der Fakultät für Biologie der Ludwig-Maximilians-Universität München. München. 177 pp.
- Bonilla-Gomez, M.A. & Nates-Parra, G. 1992. Abejas euglosinas de Colombia (Hymenoptera: Apidae) I. Claves ilustradas. *Caldasia*, 17, 149–172.
- Dressler, R.L. (1978) An infrageneric classification of *Euglossa*, with notes on some features of special taxonomic importance (Hymenoptera; Apidae). *Revista de Biología Tropical*, 26, 187–198.
- Dressler, R.L. (1982) New species of *Euglossa*. III. The *bursigera* species group (Hymenoptera: Apidae). *Revista Biología Tropical*, 30, 131–140.
- ESRI (2004) ArcGIS. Version 9.1 [computer program]. Redlands, CA. ESRI Inc. (USA).
- Hackett, S.J. 1996. Molecular phylogenetics and biogeography of tanagers in the genus *Ramphocelus* (Aves). *Molecular Phylogenetics and Evolution* 5, 368–382.
- Latreille, P.A. (1802) *Histoire Naturelle des Fourmis*. Paris, 445 pp.
- Michener, C.D. (2000) *The bees of the world*. Johns Hopkins University Press, Baltimore, MD, 913 + xiv pp
- Moure, J.S. (1989) *Glossuropoda*, novo subgênero de *Euglossa*, e duas espécies novas da Amazônia, do mesmo subgênero (Apidae-Hymenoptera). *Memórias do Instituto Oswaldo Cruz*, 84, 387–389.
- Ramírez, S. (2005) *Euglossa paisa*, a new species of orchid bee from the Colombian Andes

- (Hymenoptera: Apidae). *Zootaxa*, 1065, 51–60.
- Ramírez, S. (2006) *Euglossa samperi* n. sp., a new species of orchid bee from the foothills of the Ecuadorian Andes (Hymenoptera: Apidae). *Zootaxa*, 1272, 61–68.
- Ramírez, S., Dressler, R.L. and Ospina, M. (2002) Orchid bees (Hymenoptera: Apidae: Euglossini) from the Neotropical Region: A species checklist with notes on their biology. *Biota Colombiana*, 3, 7–118.
- Rasmussen, C. & Skov, C. (2006) Description of a new species of *Euglossa* (Hymenoptera: Apidae: Euglossini) with notes on comparative biology. *Zootaxa*, 1210, 53–67.
- Roubik, D.W. (2004) Sibling species of *Glossura* and *Glossuropoda* in the Amazon Region (Hymenoptera: Apidae: Euglossini). *Journal of Kansas Entomological Society*, 77, 235–253.
- Roubik, D. W. & Hanson, P. E. (2004) *Orchid Bees of Tropical America: Biology and Field Guide*. INBIO, Heredia, Costa Rica, 370 pp
- Smith, F. (1874) A revision of the genera *Epicharis*, *Centris*, *Eulaema* and *Euglossa*, belonging to the family Apidae, section Scopulipedes. *Annals and Magazine of Natural History*, 13, 440–446.