FIRST RECORD OF *EUFRIESEA BARE* GONZÁLEZ & GAIANI AND NOTES ON THE DISTRIBUTION OF THREE SPECIES OF ORCHID BEES PERTAINING TO THE GENUS *EUGLOSSA* LATREILLE (APIDAE: EUGLOSSINI) IN COLOMBIA

Por

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Abstract

Parra-H., A. & G. Nates-Parra: First record of *Eufriesea bare* González & Gaiani and notes on the distribution of three species of orchid bees pertaining to the genus *Euglossa* Latreille (Apidae: Euglossini) in Colombia Rev. Acad. Colomb. Cienc. **31**(120): 415-423, 2007. ISSN 0370-3908.

Knowledge on the geographical distribution of orchid bee species in Colombia and most of the Neotropics depends on monitoring and sample methodologies implemented and facilities to access diverse natural regions. In addition, for research on distribution of species, the taxonomic impediment is a problem for the identification and confirmation of some species, although the tribe Euglossini presents a relatively well developed taxonomy. Herein is presented the first record of *Eufriesea bare* in Colombia, an orchid bee species known only the Venezuelan Amazonian region; as well as the distribution of three euglossine species of the genus *Euglossa*.

Key words: Amazon basin, Andes, Chocó region, Colombia, eastern llanos foothill, *Eufriesea bare*, *Euglossa*, Euglossini, first record, orchid bees, taxonomy.

Resumen

El conocimiento sobre la distribución geográfica de las especies de abejas de las orquídeas en Colombia y la mayor parte del neotrópico depende de las metodologías de monitoreo y muestreo que se implementen además de las facilidades de acceder a las diversas regiones naturales. Igualmente, para la investigación sobre la distribución de las especies, el impedimento taxonómico es un problema para la identificación y confirmación de algunas especies, a pesar que la tribu Euglossini presen-

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ta una taxonomía relativamente bien desarrollada. En este trabajo se presenta por primera vez en Colombia un registro de *Eufriesea bare*, una especie de abeja de las orquídeas conocida únicamente de la cuenca amazónica venezolana, a la vez que se presenta la distribución de tres especies de euglosinos del género *Euglossa*.

Palabras clave: Abejas de las orquídeas, Andes, cuenca amazónica, Chocó, Colombia, *Eufriesea bare*, *Euglossa*, Euglossini, piedemonte llanero, primer registro, taxonomía.

Introduction

Orchid bees (Apidae: Euglossini) commonly occur in wet forests in the Neotropical Region (**Pearson & Dressler**, 1985) although a few species happen in xeric like open habitats (**Roubik**, 2004; **Roubik & Hanson**, 2004). The tribe has a frequent distribution from the sea level up to 1700 meters of elevation, while few species are found above higher altitudes as transients (**Dick *et al.*** 2004; **Nates-Parra *et al***., 2006). The tribe Euglossini subsists among vast natural areas (**Roubik & Hanson,** 2004), even though some species can survive in less conserved areas since their social structure gives them plasticity for the exploitation of resources (**Parra-H *et al.***, 2005; **Parra-H & Nates-Parra**, 2007). In addition, it is also known that orchid bees prefer certain resources and in consequence unfold complex foraging behaviors (**Ackerman *et al.***, 1982; **Kato *et al.*,** 1992).

The particular topography in Colombia, given by the three Andean mountain chains, has had a strong influence in the biology and biogeography of Euglossine species, limiting and conditioning the actual distribution array of the tribe (**Dick *et al.,*** 2004). In Colombia, orchid bees distribute through all natural regions (**Bonilla-Gomez & Nates-Parra**, 1992; **Ramirez *et al.***, 2002) and some species occur in a characteristic cross Andean array (**Dick *et al.***, 2004). Some authors asseverate that the reason for this arrangement responds in part to the thermal regulation capabilities of some large species (**Inouye**, 1975), the extraordinary Euglossine performances and wide flight ranges (**Kroodsma**, 1975; **Dudley,** 1995).

Geographical and biological studies among orchid bees distribution, implicate a well taxonomic resolution, which in the tribe is partially well developed (**Ospina-Torres *et al.***, 2006), albeit sampling design and previous knowledge of particular study areas, would provide specific results on species diversity (**Nemesio & Silveira,** 2004). Taxonomic impediment could be resolved by means of genital morphology, which in addition to external morphology, seems to be of great value in the trustworthy taxonomic identifications, especially for species of the genus *Euglossa* Latreille (**Ospina-Torres *et al.***, 2006).

For the genus *Eufriesea* Cockerell, no recent new species have been described (**Cameron,** 2004; **Oliveira pers. com**). *Eufriesea bare* González & Gaiani was described in the Venezuelan Amazon basin (**González & Gaiani,** 1989; **Ramírez *et al*.,** 2002). It seems there, have been poorly sample efforts which consider that the genus *Eufriesea* resemble seasonal variations because their pupal diapause (**Kimsey**, 1982) which makes difficult monitoring its´ species.

Euglossa hemichlora Cockerell has been reported for Colombia in the Chocó region and Amazon basin. *Euglossa ioprosopa* Dressler, as well as *Euglossa mourei* Dressler, are only known in Colombia in the Amazon basin (**Ramírez *et al.***, 2002).

Herein we report for the first time a male of *Eufriesea bare* collected in the forest canopy of the Colombian Amazon region. We also report new records of *Euglossa hemichlora* in the north of the eastern Colombian Andes and eastern llanos foothill: and *E. ioprosopa* and *E. mourei* in the Colombian Chocó region.

Materials and methods

Individuals of those orchid bee species (*Eufriesea bare*, *Euglossa hemichlora*, *E. ioprosopa* and *E. mourei*) from the bee collection of the Laboratorio de Investigaciones en Abejas (LABUN), Universidad Nacional de Colombia were examined (Appendix 1). A preliminary confirmation of the individual's identification was conducted following the taxonomic key proposed by **Bonilla-Gómez & Nates-Parra** (1992). Afterward, the genital capsule was extracted and compared with the original description (*Eufriesea bare*) and reference material (*Euglossa* spp.). For the specimens of *Euglossa*, the gonostilus was removed and prepared following **Ospina-Torres *et al.*** (2006) for comparison with gonostilus from the reference material deposited at the LABUN. Images were generated using a digital camera.

Results

External and genital morphology is perfectly congruent with, as original descriptions for the *Eufriesea bare* male (Figs. 1, 2) as the reference material for the individuals of *Euglossa* (Fig 3).

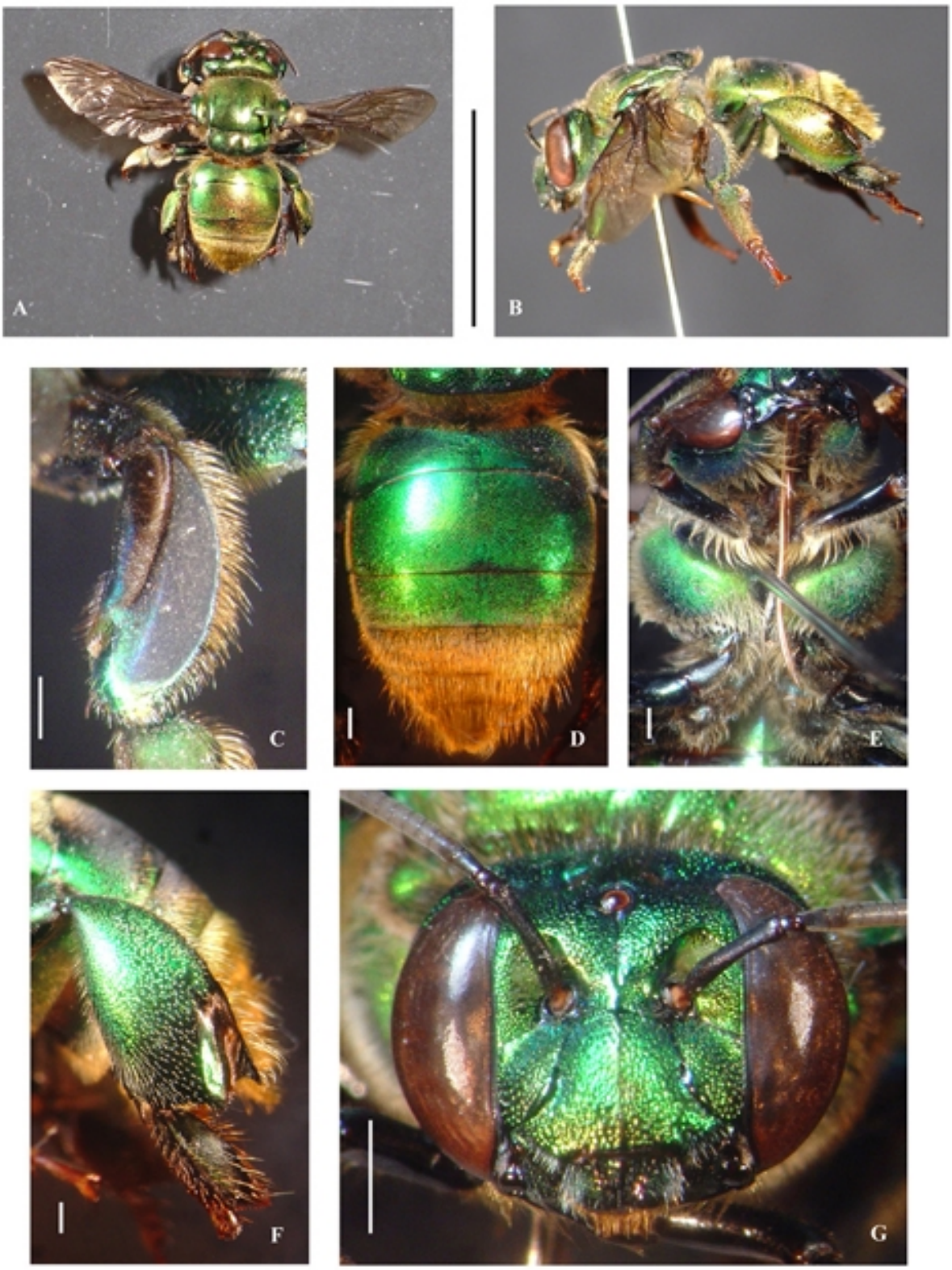

Figure 1. *Eufriesea bare* male (LABUN 17976). A, body dorsal view; B, body lateral view (scale 10 mm.); C, mid tibial velvety area; D, abdomen dorsal view; E, thorax ventral view; F, hind tibia and G, head frontal view (scale 0.83 mm.).

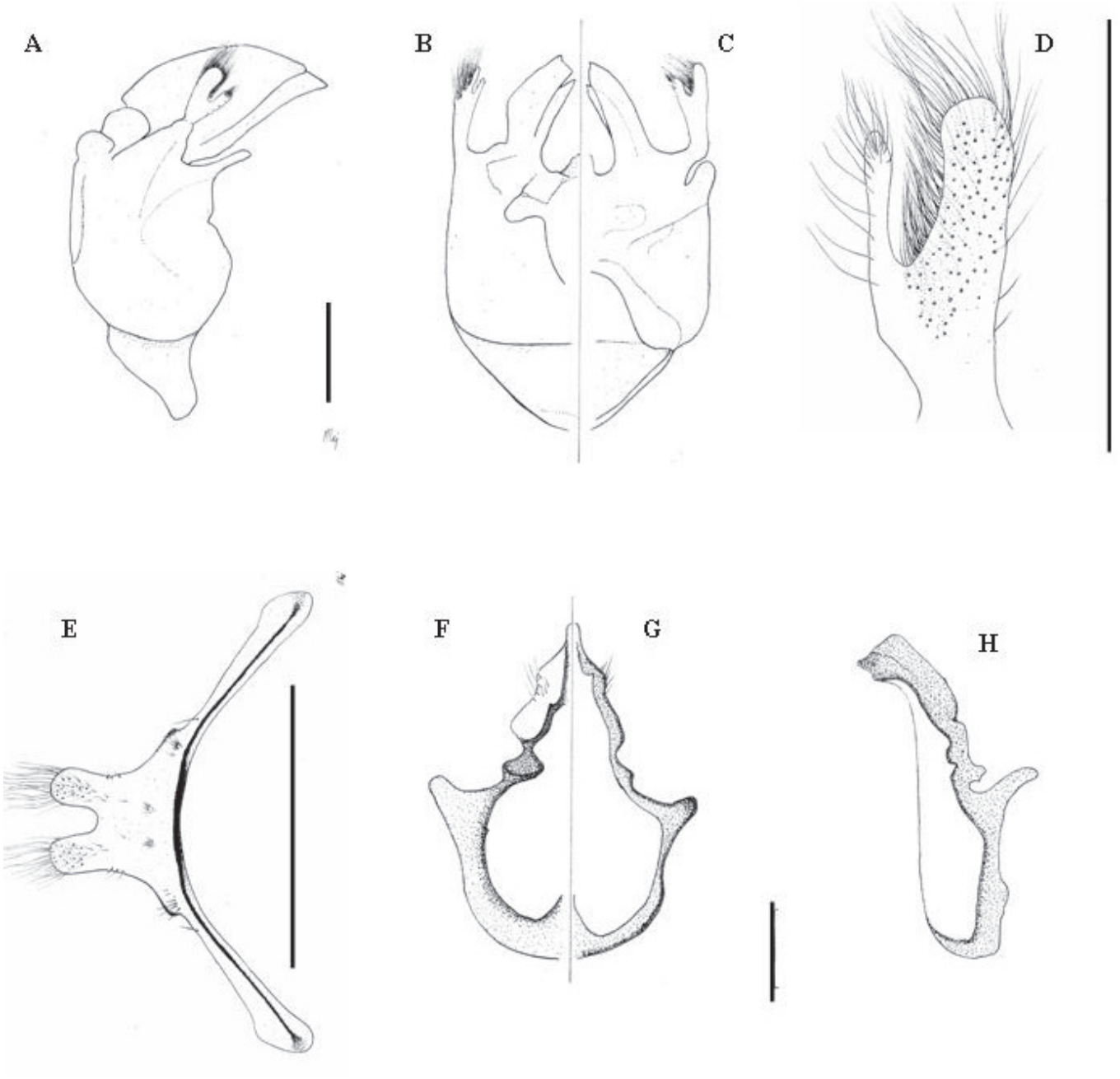

Figure 2. Male genitalia of *Eufriesea bare (*LABUN 17976). A, Genital capsule lateral view; B, dorsal view and C, ventral view; D, gonostilus; E, sternite VII; F, subgenital plaque dorsal view; G, ventral view and H, lateral view (Scale 0.83 mm.).

Figure 3. Head frontal view, mid tibial velvety area and gonostilus of: A, *Euglossa hemichlora* (LABUN 18119); B, *E. ioprosopa* (LABUN 18319) and *E. mourei* (LABUN 18539) (Scale 0.83 mm.).

Figure 4. Distribution in Colombia of *Eufriesea bare* (s), *Euglossa hemichlora* (*), *Euglossa ioprosopa* (o) and *Euglossa mourei* («).

A single male of *Eufriesea bare* is registered in the Amazon basin in the Tararira municipality (Vaupés, Colombia). New records of *Euglossa hemichlora* are registered in Floridablanca municipality (Santander, Colombia) and municipalities of Cumaral, Acacías and Villavicencio (Meta, Colombia). *E. ioprosopa* is registered in Bahía Solano municipality (Chocó, Colombia) and *E. mourei* is reported from Barbacoas municipality (Nariño, Colombia). An uncommon record of *E. ioprosopa* from Bogotá city (located 2560 meters above sea level) is reported, but it seems to be an accidental appearance explained by means of a possible nest that was transported in a wood shipment from a region where the species naturally occur (**Parra-H & Nates-Parra,** 2006). The additional records of *Euglossa* species correspond to the natural regions where this genus has been previously reported in Colombia (Fig. 4).

Discussion

Eufriesea bare is a distinct orchid bee species, very different in its coloration and pilosity from the known species of the genus in Colombia. In addition, the Venezuelan Amazon region, from *E. bare* was described (**González & Gaiani**, 1989) corresponds to the same physiographic unit (*sensu* **Rangel-Ch & Aguilar-P**, 1995) were we are reporting it for Colombia.

The knowledge of orchid bees in Colombia do not necessarily corresponds to a representative sample of the total naturals regions where they occur, but we consider that, by means of the biological and ecological aspects of the Tribe, it is possible to infer or predict its probable distribution. Indeed, it is required to implement studies on biology while inventories are developed. Attest of this, are the records presented in this work and the recent descriptions of new euglossine species from regions of difficult access or which have been poorly sampled (*e.g*. **Ramírez,** 2006; **Parra-H *et al.***, 2006).

On the other hand, the records of the species of *Euglossa* registered for the biogeographic Chocó region, northeastern Andes and eastern llanos foothill, let us propose that the distribution *E. hemichlora*, *E. ioprosopa* and *E. mourei* throughout Colombia, could be that of a cross Andean species (*sensu* **Dick *et al.***, 2004). If the Andean Chain Mountains arose early after Euglossine bee's appearance, the subsequent diverse physiological and biological adaptations would have limited them to the particular habitat were they actually occur. Additionally, social plasticity and the thermal capabilities favor some species to occupy diverse habitats across altitudinal gradients (**Parra-H *et al.,*** 2005).

Then, in the genus *Euglossa*, as it happens in large species, the specializations expressed in resource exploitation could not be fairly different to the other Euglossini genera, but subsequently, the social structure predominant among this genus could have segregated its´ species to the niche amplitude that they actually display: mid to low elevation lands.

Acknowledgments

Authors are grateful to Universidad Nacional de Colombia, sede Bogotá. Also we specially thank Marcio Luiz de Oliveira, Evandson José dos Anjos Silva, Carlos Alberto Garófalo and David Roubik for their aid in the identification of the male of *Eufriesea* and Martha Lucia Bueno, Mariana Cadavid and Víctor H. González for review and provide useful comments on the manuscript.

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Recibido: marzo 21 de 2007

Aceptado para su publicación: septiembre 24 de 2007

Appendix 1

Examined material from Laboratorio de Investigaciones en Abejas LABUN, Departamento de Biología, Universidad Nacional de Colombia, Bogotá. Sorted by LABUN number.

Eufriesea bare González & Gaiani 1989.

MALE. **Colombia.** Vaupés. Taraira. Caparú biology station. Collected by L. Benavides in a canopy Malaise.10/12/02. 200 m. LABUN 17976.

Euglossa hemichlora Cockerell 1917.

MALE. **Panamá.** Cerro Jefe. Collected by R. L. Dressler. 17/07/69. LABUN 1731; FEMALE. **Ecuador.** Pichincha. Santo Domingo. Collected by R. L. Dressler. 22/07/67. LABUN 1732; MALE. **Colombia**. Valle del Cauca. Cali. Collected by B. Losada. 1/04/45. LABUN 5783; MALE. **Colombia.** Meta. Villavicencio. E.B.T.R.F. 590 m. 22/03/93. LABUN 14220, 14222; MALE. **Ecuador.** Pichincha. Santo Domingo. Collected by R. L. Dressler. 28/07/67. LABUN 15044; MALE. **Panamá.** Barro Colorado. Collected by Silberglied–Aiello, Bencil benzoate. 1/07/78. LABUN 15045; MALE. **Panamá.** Barro Colorado. Collected by R. L. Dressler in *Notylia panamensis*. 18/06/68. REF LABUN 15046; MALE. **Colombia.** Chocó. Bahía Solano. Huaca. Finca. Collected by R. Ospina-Torres, Metil Salicilate. 22/07/93. LABUN 16471; MALE **Colombia.** Meta. Cumaral. San Nicolás. Collected by A. Parra-H, Cineole. 16/11/03. LABUN 16679; MALE. **Colombia.** Meta. Villavicencio. Collected by J. Hernández Cineole. 560 m. 8/04/01. LABUN 16714; MALE. **Colombia.** Caquetá. Paujil. Vereda Puente Albania. Collected by V. H. González. 450 m. 2/04/96. LABUN 17042, 17043, 17044; FEMALE. **Colombia.** Santander. Floridanblanca. Casiano. Finca Las Brisas. Collected by G. Nates-Parra & A. Parra-H, in trap nest. 1160 m. 2/10/04. LABUN 18071, 18109, 18110, 18111, 18112, 18114, 18118; MALE. **Colombia.** Meta. Acacías. Vereda San José. Collected by A. Parra-H, Cineole, forest fragment. 600 m. 5/10/04. LABUN 18082; MALE. **Colombia.** Santander. Floridanblanca. Casiano. Finca Las Brisas. Collected by A. Parra-H, in trap nest. 1160 m. 3/10/04. LABUN 18108, 18113, 18119.

Euglossa ioprosopa Dressler 1982.

MALE. **Colombia.** Amazonas. Araracuara. Margeniza. Rio Caquetá. Collected by M. Torres, wet forest. 100 m. 1/12/88. LABUN 5471; MALE. **Colombia.** Amazonas. Letícia. Collected by R. L. Dressler Vainillin. 80 m. 9/06/74. REF LABUN 6044 Paratype; MALE. **Peru.** Huanuco. Llulla pichis. Río Pchitea. Collected by R. L. Dressler, Skatole. 6/02/75. REF LABUN 6045; MALE. **Colombia.** Chocó. Bahía Solano. Playita. Collected by G. Gerlach, 2 n metilamin benzaldehide. 40 m. 1/09/94. LABUN 16328, 16419; MALE. **Colombia.** Caquetá. Paujil. Vereda Puente Albania. Collected by V. H. González. 450 m. 31/03/96 LABUN 17048; MALE. **Colombia.** Amazonas. Leticia. Imani. Collected by C. Quijano, Cienole. 80 m. 24/10/02. LABUN 17071; MALE. **Colombia**. Cundinamarca. Bogotá. Quiroga. Collected by N. Ballona, in *Impatiens balsamina*. 2650 m. 1/10/05. LABUN 18319.

Euglossa mourei Dressler 1982.

MALE. **Colombia.** Amazonas. Leticia. Collected by R. L. Dressler, Vainillin. Paratype. 80 m. 6/06/74. REF LABUN 6063; MALE. **Colombia.** Caquetá. Valparaiso. Collected by H. Robinson, Cineole.7/11/68. REF LABUN 6064; MALE. **Colombia.** Nariño. Barbacoas. Corregimiento Altaquer. La Tajada. Collected by V. Solarte, Vainillin. PAÑ 183. 960 m. 7/05/05. LABUN 18539.