

# Identification Key for the Costa Rican Species of *Euglossa* Latreille, 1802 from the Costa Rican Sector of La Amistad International Park (Hymenoptera: Apidae: Apinae: Euglossini)

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## Abstract

The Costa Rican sector of the La Amistad International Park (PILA) presents a total of 16 species of orchid bees belonging to the genus *Euglossa* Latreille, 1802. This article provides an illustrated key to identify each of them, using simple characteristics, so that local people can use it without needing to be experts.

**Keywords:** Identification key, Orchid bees.

## 1. INTRODUCTION

La Amistad International Park (PILA) is the most important protected territory in Costa Rica, declared by UNESCO as a world heritage site, it has about 400,000 hectares, of which almost half are in Costa Rican territory [1], containing a great diversity of ecosystems containing nine of the twelve life zones registered for Costa Rica [2], making the area the most important reservoir of biodiversity. Within this diversity, according to data from the National Museum of Costa Rica, the genus *Euglossa* Latreille, 1802 is represented in the PILA with 16 species, which is equivalent to 37% of species reported in the literature for the entire country to date [3-7].

These bees have a close relationship with orchids, to the point where nearly 700 Neotropical species depend on Euglossines species such as *Eufriesea*, *Euglossa* and *Eulaema* for their genetic communication [8]; However, they actually also visit the flowers of other botanical groups, as well as they can search for other important resources to build their nests, which makes them a highly relevant group for the ecosystem [9-11].

In the present work, an identification key was developed for the species of this genus reported for the costarrican sector of PILA.

## 2. METHODOLOGY

A significant number of the bees used in this article were collected during a biomonitoring program based on traps with attractants, led by Parataxonomist Braulio Hernández, who carried out an exhaustive sampling of the bees of the genus *Euglossa* of the PILA, and the resulting material was deposited in the MNCR, when this collection was still in the custody of the National Institute of Biodiversity (INBio), so I proceeded to review this material and the rest of *Euglossa* bees present in the collection which were also collected in the same region.

To generate this key, a total of 16 species registered in the MNCR database were reviewed, collected both within and around the PILA, namely: *Euglossa allosticta* Moure, 1969, *Euglossa asarophora* Moure & Sakagami, 1969, *Euglossa bursigera* Moure, 1970, *Euglossa championi* Cheesman, 1929, *Euglossa deceptrix* Moure, 1968, *Euglossa dodsoni* Moure, 1965, *Euglossa flammea* Moure, 1969, *Euglossa gorgonensis* Cheesman, 1929, *Euglossa hansonii* Moure, 1965, *Euglossa heterosticta* Moure, 1968, *Euglossa imperialis* Cockerell, 1922, *Euglossa maculabris* Moure, 1968, *Euglossa mixta* Friese, 1899, *Euglossa purpurea* Friese, 1899, *Euglossa saphirina* Moure, 1968 and *Euglossa tridentata* Moure, 1970.

Photographs were taken with an Omax A35180U3 18 MP turtle camera, with an Omax A3RDF50 0.50x lens, and an Olympus SZ51 stereoscope. The focus stacking was done in Adobe Photoshop 2017, and the figure monk in Adobe Illustrator 2017.

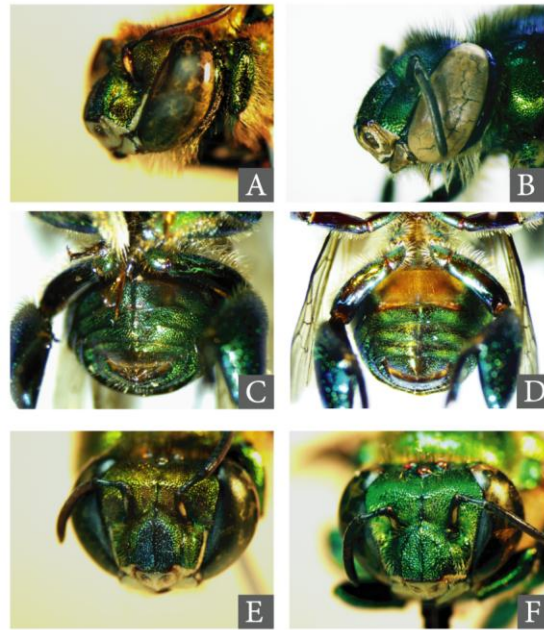
### 3. RESULTS

Identification key for the species of the genus *Euglossa* from the La Amistad conservation area:

- 1 Body length of 15mm or more.....2
- 1' Body length less than 15mm.....4
- 2 Sternite 2 with diagonal slits, each with a row of long, bushy setae (Figure 1A).....3
- 2' Sternite 2 does not have diagonal slits, nor rows of long setae (Figure 1B).....*E. asarophora*
- 3 Medial tibia with the basal and distal tufts fused (Figure 1C).....*E. imperialis*
- 3' Medial tibia with basal and distal tufts unfused (Figure 1D).....*E. flammea*
- 4 Scutellum with a slight or pronounced medial indentation (Figure 1D)----5
- 4'Scutellum without medial cleft (Figure 1E).....*E. bursigera*
- 5 Thin or barely marked medial scutellum cleft.....6
- 5' Very pronounced medial cleft of the scutellum, separating it into two lobes.....*E. allosticta*
- 6 Body length less than 11mm.....7
- 6'Body length more than 11mm.....10
- 7 Forelegs completely blue, body with turquoise-blue iridescence.....*E. sapphirina*
- 7'Legs and body predominantly green, with green or reddish-green iridescence.....8
- 8 The gloss is short, reaching the sternite II.....*E. heterosticta*
- 8' The glossa is long, almost the total length of the body or a little more.....9
- 9 Eye band present (Figure 2A).....*E. dodsoni*
- 9'Eye band absent (Figure 2B).....*E. gorgonensis*
- 10 Completely dark blue body.....*E. mixta*
- 10' Body of variable color from light blue or turquoise to green.....11
- 11 Eye band present (Fig. 2A).....13
- 11'Eye band absent (Figure 2B).....12
- 12 Sternite II with a large setae pad (Figure 2C).....*E. maculabris*
- 12' Sternite without setae pad (Figure 2D).....*E. championi*
- 13 Clypeus blue (Figure 2E).....14
- 13' Clypeus green color (Figure 2F).....15
- 14 Head predominantly with light blue to green sheen.....*E. hansonii*
- 14' Fit predominantly with light green to reddish gold shine.....*E. purpurea*
- 15 Mandible with 3 teeth, green abdomen.....*E. tridentata*
- 15' Mandible with 2 teeth, yellow abdomen.....*E. deceptrix*



**Figure 1.** Structures A) Abdomen of *E. imperialis*, B) Abdomen of *E. asarophora*, C) Middle tibia of *E. imperialis*, D) Middle tibia of *E. flammea*, E) Thorax of *E. championi*, F) Thorax of *E. bursigera*.



**Figura 2.** Structures. A) Head of *E. purpurea*, B) Head *E. gorgonensis*, C) Abdomen *E. maculabris*, D) Abdomen of *E. championi*, E) Clypeus of *E. purpurea*, F) Clypeus of *E. deceptrix*.

#### 4. DISCUSION

Although the monitoring that gave rise to the reviewed material was systematic and exhaustive, it was carried out about 10 years ago, so it is possible that there are still species that were not collected, both due to their latitudinal range of distribution, and due to the fact The PILA forest is very thick and has very extensive inaccessible areas.

According to the Museum's database, in the cantons neighboring PILA such as Corredores, Coto Brus and Golfito, at altitudes lower than those of the area of interest (between 1500 and 0 m above sea level) the species *Euglossa cognata* Moure, 1970, *E. despecta* Moure, 1968, *E. erythrochlora* Moure, 1968, *E. variabilis* Moure, 1968, *E. cyanura* Cockerell, 1917, *E. villosiventris* Moure, 1968, *E. mixta* which are not ruled out for being found in future sampling. , since the action of climate change alters population dynamics [12-14].

It is important to note that another event that could contribute to the increase in species richness in the PILA area is the urban expansion in the surrounding cantons, which would displace insect populations towards the areas of biological corridors and protected areas. ; Likewise, other studies in other areas of the country have determined that the genus *Euglossa* is a viable taxonomic group as a bioindicator through monitoring [15], which puts on the table the need to generate lists and specific keys by zones and altitudinal levels. as tools for environmental impact studies, ecological assessments, plant genetic connectivity studies and restoration.

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