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## A new species of *Eufriesea* from Bolivia, and rearrangement of the *Eufriesea auripes* species group

(Hymenoptera: Apidae)

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*Eufriesea heideri* **spec. nov.**, a very similar species to the allopatric *Eufriesea nigrohirta* (Friese), is described from Bolivia. Additionally, *E. nigrohirta* is removed from the *Eufriesea chrysopyga* (Mocsáry) species group (*sensu* Kimsey) and placed into the *Eufriesea auripes* (Gribodo) species group (*sensu* Kimsey). An identification key to the species of the latter group is provided.

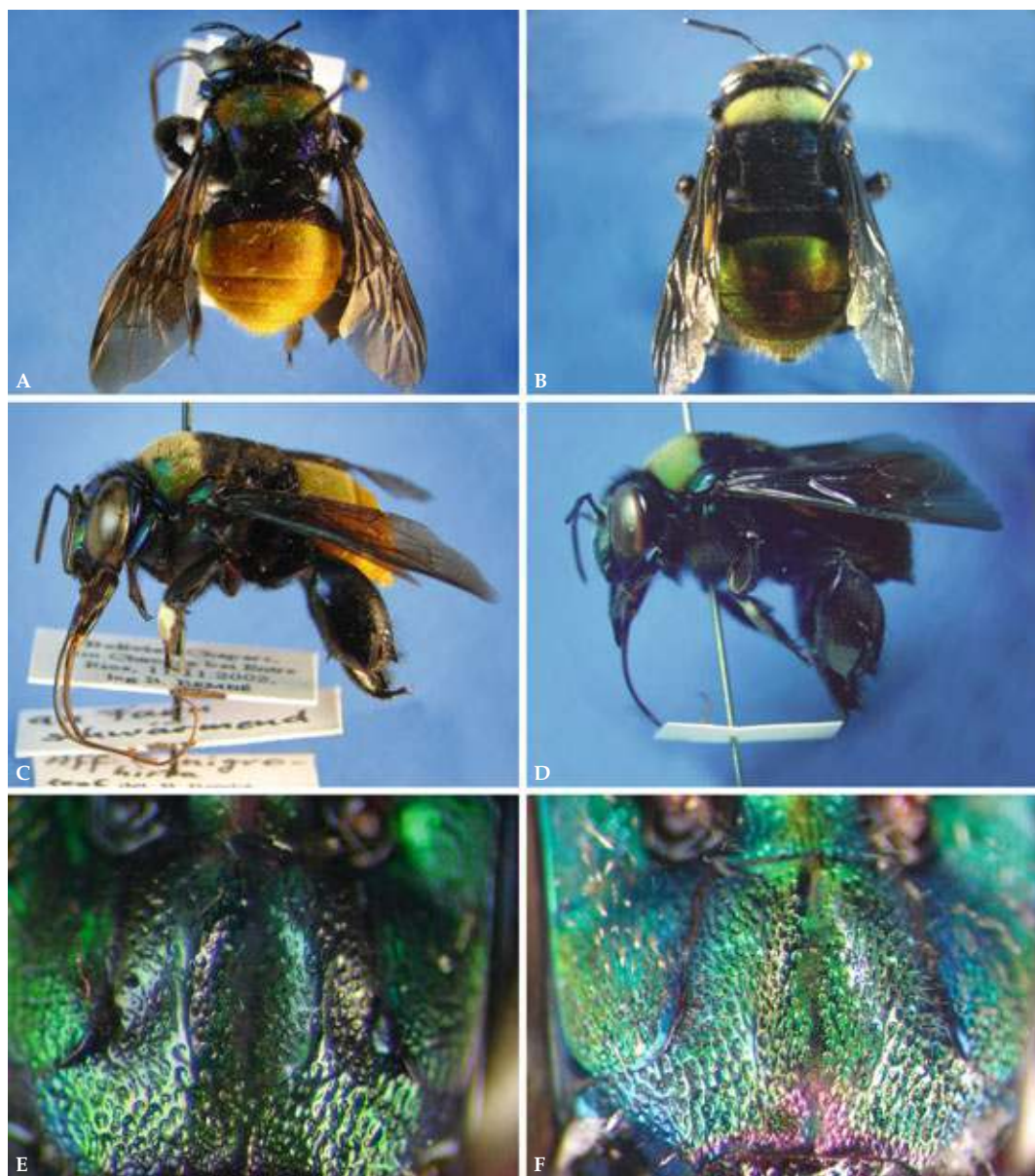
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### Introduction

*Eufriesea* Cockerell (Hymenoptera: Apidae: Apini: Euglossina) is the second largest genus of Euglossina, including more than sixty species (Kimsey 1982, Roubik & Hanson 2004). Bees in this genus are medium-sized to large (13.0 to 26.0 mm long) and show predominantly metallic colors, although species with dense hairs are also common. Several new species were described after the 1970's, when the fragrant compounds that attract males of these bees (Dodson et al. 1969) became commonly available to researchers. Nevertheless, new species are still being described in this genus (e.g. Moure 1999, Moure et al. 2001, Nemésio in press). Members of *Eufriesea* are highly seasonal, usually only active during a few months in the wet season (Kimsey 1982) and are, therefore, generally rarer in entomological collections than their closest relatives *Euglossa* and *Eulaema* species, which are active during the whole year. Nemésio and Silveira (2004) argued that this factor may lead some researchers to a false impression that *Eufriesea* species are rare in nature or that their populations are declining.

A major consequence of the low number of specimens of *Eufriesea* in collections is that there are few keys available for identification of these bees. The few ones that do exist (e.g. Kimsey 1982; Bonilla-Gómez & Nates-Parra 1992) are relatively out of date. In the particular case of the key provided by Kimsey (1982) for both sexes, it happens that for some species only one sex was known at that time and, consequently, the other sex was not included in the key. Orchid bee keys are almost always based on males only. The sorting of females to males based on color is only possible in some species, and has rarely been confirmed by raising both sexes from the same nest. The key provided by Roubik and Hanson (2004), although quite recent, is geographically restricted to Central American species and/or species that reach Central America. Two specimens collected in Bolivia by one of us (BB) closely resemble to the allopatric *Eufriesea nigrohirta* (Friese), but differed from it in some key aspects, especially the colour of the clypeus and of the hairs on the metasoma. After being compared to several *Eufriesea* species identified by other experts and deposited in several entomological collections, and after unsuccessful attempts



**Fig. 1.** A. Dorsal view of *Eufriesea heideri* spec. nov. B. Dorsal view of *E. nigrohirta*. C. Lateral view of *Eufriesea heideri* spec. nov. D. Lateral view of *E. nigrohirta*. E. Clypeus of *Eufriesea heideri* spec. nov. F. Clypeus of *E. nigrohirta*.

to establish their identity using existing keys, these two specimens remained without specific identification and are here described and treated as a new species closely related to *E. nigrohirta*.

## Material and Methods

The studied specimens belong to the entomological collections of the Universidade Federal de Minas Gerais (UFMG) in Belo Horizonte city, Brazil, and to the Zoologische Staatssammlung München (ZSM) in München, Germany. The type series comprises two male speci-



Fig. 2. Genitalia of male *Eufriesea heideri* spec. nov. A. Sternum 7. B. Sternum 8. C. Genital capsule.

mens. The holotype (male) is currently deposited at UFMG, the only paratype is housed at the ZSM. Terga and sterna are referred to as T1, T2, T3, etc., and S1, S2, S3, etc. Integument and setae coloration were described by eye using a Leica MZ12 microscope. Measurements were taken from the holotype, except of the S7 and the genitalia which were taken from the only paratype (in order to keep the holotype intact). The tongue length was measured following Kimsey (1982: 10), which is “the length of the basal two segments of the labial palpi, from the basal fold, normally resting behind the mandibles, to the two apical segments of the labial palpi”.

#### *Eufriesea heideri* Nemésio & Bembé spec. nov.

**Type material.** Holotype: male, with the following label data: “Bolivien, Chapare, Rio Chimore bei Entre Rios, 11.11.2002, leg. B. Bembé” and “an Farn schwärmend” (circling a fern plant) [Handwritten in indelible ink] and “Aff. *E. nigrohirta*, 2006 det. B. Bembé” and “12321-36322” and “*Eufriesea heideri* Nemésio & Bembé, Holotypus” (UFMG). – Paratype: male, with the following label data: “Bolivien, Chapare, Rio Chimore bei Entre Rios, 11.11.2002, leg. B. Bembé” and “an Farn schwärmend” (circling a fern plant) [Handwritten in indelible ink] and “Aff. *E. nigrohirta*, 2006 det. B. Bembé” and “*Eufriesea heideri* Nemésio & Bembé, Paratypus” (ZSM).

**Type locality.** Holotype collected at 17°07'S, 65°09'W, 310 m asl, Bolivia, Chapare, Rio Chimoré close to Entre Ríos.

**Diagnosis.** This species can be distinguished from other *Eufriesea* species by a combination of the following characters: male clypeus entirely green with two sublateral ridges and one impunctate medial stripe, face green, rest of the head dark blue, T1 entirely covered with black setae, T2-T7 entirely covered with yellow setae, anterior portion of mesosoma entirely covered with yellow setae, hindtibia with no yellow setae (Fig. 1A). This species is very similar to *Eufriesea nigrohirta* but it can be

distinguished from the latter by the following characters: the dense yellow pubescence on metasoma (T2-T7). *E. nigrohirta* has predominantly black and sparser setae (Figs. 1A-B; see also Nemésio 2005). Additionally, *Eufriesea heideri* spec. nov. has a bluish green fore basitarsus (Fig. C) and a entirely green clypeus (Fig. 1E); in *E. nigrohirta* the fore basitarsus is dark blue (Fig. 1D) and the clypeus is green with purple hues (Fig. 1F). *Eufriesea heideri* spec. nov. is also slightly larger than *E. nigrohirta*.

#### Description

**Male.** General colour and vestiture (Fig. 1A). Head metallic green, clypeus green; top of head dark blue with purplish hues. Anterior third of mesosoma dorsally metallic green, covered with yellow setae, which seen from above form a characteristic yellow stripe at each side of the mesoscutum. Scutellum and dorsal surface of T1 dark bluish-purple, with black setae; T2-T7 metallic red, entirely covered with yellow setae; wings brown.

**Head.** Width 6.4 mm; interorbital distance at base of scape 3.2 mm; maximum interorbital distance 3.4 mm; scape 2.0 mm; eye length 4.36 mm; clypeus densely punctate with two sublateral ridges and one impunctate medial stripe (Fig. 1E); punctures rounded and irregular in size (0.03 to 0.08 mm); tongue in repose reaching S2; labial palpus with four palpomeres.

**Body.** Body length ca. 16.7 mm; anterior wing ca. 15 mm; scutellum 4.6 mm wide and 2.0 mm long; metasomal width 8.5 mm; S7 lobes with the following measures: lobe length 0.8 mm, lobe width 0.25 mm, distance between lobes 0.3 mm (Fig. 2A); setae covering apical and outer margins of S7 lobes; S8 produced into two apical points in lateral view (Fig. 2B); gonostylar dorsal lobe longer than ventral one (Fig. 2C).

**Legs.** (Fig. 1C). Foretibia and fore basitarsus metallic bluish green, fringed with long, dense, black

hairs; mid basitarsus completely covered with golden hairs ventrally and black hairs dorsally and laterally; mesotibia inflated; metatibia with hairy glandular scar reaching apex; no yellow setae present on the metatibia.

**Female.** Unknown.

**Etymology.** The species epithet honours Helmut Heider, who lived in Bolivia for sixteen years. He spent some of these years examining the orchids of Bolivia and without his knowledge of the region we would have never been able to find this species.

## Discussion

The small number of specimens in the type series of *Eufriesea heideri* **spec. nov.** is a consequence of the logistical difficulties with collecting *Eufriesea*, a highly seasonal genus (Kimsey 1982), and of the lack of long-term surveys in Bolivia and the neighbouring states of Central Brazil and Peru (see Bembé & Heider 2005; Bembé 2007).

Despite the small number of specimens, however, *Eufriesea heideri* **spec. nov.** is clearly morphologically distinct from the quite similar and allopatric *E. nigrohirta*. Apart from the morphological characters, *E. nigrohirta* is a bee typical of relatively high elevations (over 1000 m above sea level) from eastern Brazil, and is usually found in “rocky fields”, an open vegetation with sparse and low trees (see Nemésio 2005). In contrast, *Eufriesea heideri* **spec. nov.** was found in lowland forests, a completely different habitat – its habitat lies exactly on the transition between montane and lowland forests, but at very low elevation (ca. 300 m asl) when compared to the habitat of *E. nigrohirta*. The two males were observed for some minutes approximately at 11:00 a.m. while circling through a fern plant. They flew approximately one meter above the soil surface without landing, directly on the edge of the rainforest. Then they were captured with a net. We could not find more bees of this species neither on this place nor at fragrance baits some kilometres away in the same forest. In Villa Tunari, nearly 40 km distant from this place, the orchid bee fauna was surveyed during several years (Bembé & Heider 2005). Neither there nor on other places in this region was this species seen. Therefore it is supposed that *Eufriesea heideri* **spec. nov.** is not attracted to the known chemical baits usually used in orchid bee studies.

In her monograph, Kimsey (1982:18) established twelve groups of *Eufriesea* “to show structural relationships between species and to aid in the identification of individual species”. A thirteenth “group”

was composed by three species [*E. mariana* (Mocsáry), *E. pretiosa* (Friese), and *E. vidua* (Moure)] “not similar to any other and therefore not placed in a group” (Kimsey 1982:21). Interestingly, Kimsey (1982:19) had already placed *E. pretiosa* in the *Eufriesea ornata* (Mocsáry) group.

Kimsey (1982) included *E. nigrohirta* in the *Eufriesea chrysopyga* (Mocsáry) group, defined by possessing “one clypeal ridge; tongue short; two or more terga darkly coloured; and male labrum sharply pointed in lateral view”, including the following species: *E. chrysopyga*, *E. nigrohirta*, *E. boharti* (Kimsey), *E. combinata* (Mocsáry), *E. magrettii* (Friese), *E. rufocauda* (Kimsey), and *E. venezolana* (Schrottky). Nevertheless, regarding *E. nigrohirta*, Kimsey (1982: 68) states that “only the holotype female was seen, and it closely resembled females in the *chrysopyga* group because of the dark terga, clypeus with one medial ridge, and short tongue”. In the paragraph before, in the diagnosis of *E. nigrohirta*, the same author said: “T-I blackish with black setae; T-II-VI green to coppery, depending on angle of light and specimen”. If only the holotype was seen, it was impossible for her to know that colour of T-II-VI depended on the specimen. Moreover, and more important, she stated that only T-I was dark (blackish), and the definition of the group included two or more terga darkly coloured. The other terga were referred as green to coppery. At that time, the male of *E. nigrohirta* was not known, as pointed out by Kimsey (1982:68). Nemésio (2005) recently described the male of this species and showed that only the T1 was black, as in females. Besides, as with *Eufriesea heideri* **spec. nov.**, male *E. nigrohirta* does not possess one clypeal ridge. It is an impunctate line with no elevation. For all these reasons, *E. nigrohirta* is excluded from *Eufriesea chrysopyga* species group and is, together with *Eufriesea heideri* **spec. nov.**, tentatively placed in *Eufriesea auripes* (Gribodo) species group.

Species of the *Eufriesea auripes* group (*sensu* Kimsey, 1982: 19) possess the following characters: “face broad, male clypeus with one to three low welts, female clypeus with one medial ridge, both strongly depressed at tentorial pits; labrum broader than wide; T-II-VI or VII coppery to brassy with yellow setae and tongue short, reaching no farther than hindcoxa”. All these features are shared by *E. nigrohirta* and *Eufriesea heideri* **spec. nov.** (see Material and Methods for definition of tongue length). The species included in this group by Kimsey (1982) are: *E. auripes*, *E. laniventris* (Ducke), *E. distinguenda* (Gribodo), *E. convexa* (Friese), and *E. xantha* (Kimsey). *E. xantha* was considered by Kimsey & Dressler (1986) as a junior synonym of *E. vidua* (Moure). This synonymy was followed by



Moure (1999) and by Roubik and Hanson (2004). On the other hand, Kimsey (1982) and Kimsey and Dressler (1986) considered *E. dentilabris* (Mocsáry) as a junior synonym of *E. distinguenda*, a position not followed by Moure (1999) and Nemésio and Silveira (2007), but accepted by Roubik and Hanson (2004). We tend to agree with Moure (1999) and Nemésio and Silveira (2007) and treat *E. dentilabris* and *E. distinguenda* as different species. Nevertheless, it was not possible to see the holotype of *E. distinguenda* and, at least by the short diagnosis of it given by Kimsey (1982:46), it was not possible to distinguish it from *E. dentilabris* specimens, and we preferred to keep *E. dentilabris* as a junior synonym of *E. distinguenda* for the moment. As a consequence, the *Eufriesea auripes* group (sensu Kimsey 1982) gets characterized as follows: *E. auripes*, *E. convexa*, *E. distinguenda*, *Eufriesea heideri* **spec. nov.**, *E. laniventris*, *E. nigrohirta*, and *E. vidua*.

#### Identification key to the males of *E. auripes* species group (modified from Kimsey, 1982)

- 1 T1 with only yellow setae .....2
- T1 with black setae..... 3
- 2 T1 densely clothed dorsally in pale yellow setae; colour of tergal integument obscured by dense setae.....*Eufriesea vidua* (Moure)
- T1 with sparse yellow setae dorsally; tergal integument coloration not obscured by dense setae.....*Eufriesea laniventris* (Ducke)
- 3 T1 entirely black with only black setae.....4
- T1 dark greenish black with black setae, but with anterior margin green with short yellow setae above slit..... *Eufriesea convexa* (Fries)
- 4 Anterior half of mesoscutum metallic green with black setae.....5
- Anterior half of mesoscutum metallic green with yellow setae.....6
- 5 Hindtibia greatly enlarged, fully clothed in appressed yellow setae.....*Eufriesea auripes* (Gribodo)
- Hindtibia not greatly enlarged, with at most only posterior stripe of yellow setae.....*Eufriesea distinguenda* (Gribodo)
- 6 T2-T7 entirely covered with only yellow setae.. *Eufriesea heideri* **spec. nov.**
- T2-T7 with (mostly) black and yellow setae..... *Eufriesea nigrohirta* (Fries)

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## Resumo

*Eufriesea heideri* **spec. nov.**, uma espécie bastante similar à *Eufriesea nigrohirta* (Fries), é descrita da Bolívia. Além disso, *E. nigrohirta* é retirada do grupo *Eufriesea chrysopyga* (Mocsáry) (sensu Kimsey) e transferida para o grupo *Eufriesea auripes* (Gribodo) (sensu Kimsey). É fornecida uma chave de identificação para este último grupo.

## Zusammenfassung

*Eufriesea heideri* **spec. nov.** aus Bolivien wird neu beschrieben. Die Art ist der allopatrischen *Eufriesea nigrohirta* (Fries) sehr ähnlich. Zudem wird *E. nigrohirta* aus der *Eufriesea-chrysopyga*-Artengruppe (sensu Kimsey) in die *Eufriesea-auripes*-Artengruppe (sensu Kimsey) verschoben. Für letztere Artengruppe wurde ein Bestimmungsschlüssel erstellt.

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