A new species of *Eufriesea* Cockerell (Hymenoptera, Apidae, Euglossina) from northeastern Brazil¹

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ABSTRACT. A new species of *Eufriesea* Cockerell (Hymenoptera, Apidae) from northeastern Brazil. *Eufriesea pyrrhopyga* **sp. nov.** a short-tongued *Eufriesea* is described as a new species. It can be easily recognized for its predominantly violet lower from and thorax, violet tergum 1 contrasting with the strong reddish coloration on the lateral portions of terga 2 to 4 and on entire terga 5 and 6, and head pubescence with contrasting colors, white on the lower two-thirds of the face and black on upper from and vertex. This new species, collected in Recife (Pernambuco, Brazil), apparently is restricted to the Pernambuco endemic center, and seems to be highly endangered.

KEYWORDS. Euglossini; orchid bees; Neotropical; taxonomy.

RESUMO. Uma nova espécie de *Eufriesea* Cockerell (Hymenoptera, Apidae, Euglossina) do nordeste brasileiro. *Eufriesea pyrrhopyga* **sp. nov.**, uma *Eufriesea* de língua curta, é descrita como espécie nova. Esta espécie pode ser facilmente reconhecida pela cor predominantemente violeta na região inferior da fronte e no tórax; primeiro tergo violeta, contrastando com a coloração avermelhada intensa nas porções laterais dos tergos 2 à 4 e nos tergos 5 e 6; e pela pilosidade da cabeça com cores contrastantes, com pêlos claros nos dois terços inferiores da face e escuros na região superior da fronte e no vértice. Esta nova espécie, coletada em Recife, (Pernambuco, Brasil) está aparentemente restrita ao Centro de Endemismo Pernambuco, e parece correr um sério risco de extinção.

PALAVRAS-CHAVE. Abelhas-das-orquídeas; Euglossini; Neotropical; taxonomia.

The Pernambuco endemism center includes the entire portion of the coastal Atlantic forest north of the São Francisco River and is one of the most seriously threatened hotspot of the Brazilian Atlantic forest (Silva & Castelleti 2003; Tabarelli & Roda 2005). Diversity of the Atlantic forest in this region remains underestimated (Tabarelli *et al.* 2006) and some new taxa were described only recently (*e.g.* Silva *et al.* 2002; Peixoto *et al.* 2003; Tabarelli *et al.* 2006), including new orchid bee species (Moure & Schlindwein 2002; Nemésio 2010).

Regarding orchid bees, ca. 20 species are currently found in the Pernambuco endemism center (Darrault *et al.* 2006; see also Moure *et al.* 2007 and Nemésio 2009), including the endemic species *Euglossa perpulchra* Moure & Schlindwein, 2002, and the recently described *Eulaema felipei* Nemésio, 2010. Among them, only two species of *Eufriesea* are found in this region, *E. atlantica* Nemésio, 2008 and *E. mussitans* (Fabricius, 1787).

Eufriesea Cockerell includes orchid bees whose metasoma has either a mostly exposed and strongly metallic integument (the Euglossa-like species) or a dense cover of long setae that hides the integument (the Eulaema-like species; see Kimsey 1982; Nemésio 2009). An important behavioral trait of Eufriesea is that most species are active only during a few months in the rainy season (Dressler 1982; Kimsey 1982; Cameron 2004). This can be one of the reasons why these bees are less represented than Euglossa and

Eulaema in most entomological collections (Nemésio 2008). Biological traits of *Eufriesea* species are poorly known. Only a few scattered data regarding nest morphology, parasites, host plants and aromatic compounds attractive to males are currently available for them (see Ramírez *et al.* 2002; Roubik & Hanson 2004).

The genus was revised by Kimsey (1982), in which 53 species were recognized. Since her revision, 12 new species have been proposed, totalizing 65 valid species (Moure *et al.* 2007; Ayala & Engel 2008; Nemésio 2008; Nemésio & Bembé 2008). Here a new species of *Eufriesea* from the Pernambuco endemism center is described.

MATERIAL AND METHODS

The morphological terminology follows Michener (2000) and Kimsey (1982). All measurements are in millimeters. The density of punctation, intervals between punctures, was based on relative puncture diameter, pd (e.g. 1 pd: about 1x the puncture diameter between the punctures). Integumental color was described under an 18W fluorescent lamp. The color images were obtained on camera Leica DFC 500 associated to a stereomicroscope MZ 16 and processed by the software Automontage (Syncroscopy). The labels of examined specimens are transcribed, where one inverted bar symbol (\) indicates the different lines in the label, two inverted bars (\) indicate information on the back side of the label, and the quo-

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tation marks indicate different labels associated with the specimen. In the labels, the signs of male and female were transcribed as M and F, respectively. The studied specimens belong to the Department of Zoology, Universidade Federal do Paraná, Coleção Pe. J. S. Moure, Curitiba, Brazil (DZUP).

Eufriesea pyrrhopyga sp. nov. (Figs. 1–5)

"Euplusia iopyrrha Moure" Lopes & Machado (1998: 71, 77, 78) [nom. nud.].

Diagnosis and Comments. *Eufriesea pyrrhopyga* **sp. nov.** can be easily recognized for its lower frons with conspicuous violet reflections (Fig. 2), predominantly violet thorax (Figs. 1 and 2), violet T1 (Fig. 4) contrasting with the strong reddish coloration on the lateral portions of T2 to T4 and on entire T5 and T6 (Figs. 1 and 4), and head pubescence with contrasting colors, white on the lower two-thirds of the face and black on upper frons and vertex.

This new species can be easily distinguished from the two other Atlantic Forest *Eufriesea* whose female integument is predominantly violet, *E. brasilianorum* (Friese, 1899) and *E. violacea* (Blanchard, 1840), by the reddish coloration on its terga (T2 to T6), a feature not exhibited by the two latter species (see Kimsey 1982 and Nemésio 2009). Furthermore, they do not occur in sympatry with *Eufriesea pyrrhopyga* **sp. nov.**: *E. brasilianorum* is known only from Espírito Santo (Moure *et al.* 2007; Nemésio 2009); and *E. violacea* seems associated with the semi-deciduous inland forests (Nemésio 2009) and apparently does not occur in northeastern Brazil (Kimsey 1982; Moure *et al.* 2007; Nemésio 2009). Also, *E. pyrrhopyga* **sp. nov.** differs from *E. atlantica* and *E. mussitans*, the other two *Eufriesea* inhabiting the Pernambuco endemic zone, by its distinct color pattern and smaller body size.

Eufriesea pyrrhopyga sp. nov. is structurally very similar to E. purpurata (Mocsáry, 1896), females having a flat suprantennal area, lateral ocelli widely placed apart, short and shallow antennal scrobe and erect hairs on head with apex conspicuously curved. It differs from E. purpurata by presence of violet reflections on the lower face (entirely green in E. purpurata), violet thorax (mostly brassy green in E. purpurata), entire T1, most of T2 disc and central portion of T3-T4 violet (posterior half of T1 brassy green and remaining terga coppery, reddish purple or orange in E. purpurata), labrum with mostly dark hairs (pale yellow in E. purpurata), lower frons and clypeus with white hairs and upper frons and vertex fully covered with black setae (face entirely covered with pale yellow hairs in E. purpurata). Also, as in E. pulchra (Smith, 1854) and E. lucifera Kimsey, 1977, females of E. pyrrhopyga sp. nov. and E. purpurata have a relatively flat face covered with a dense pubescence of curved setae. These features are likely adaptations to directly remove pollen from flower anthers using the head.

Description. Holotype female. Body length: 15; maximum head width: 6.0; maximum head length: 4.2; forewing length: 11.3. Color: Integument predominantly metallic violet. Upper

frons and vertex dark brassy green; gena mostly violet, its upper portion with a dark green stripe along the eye; antenna brown. Inner surface of hind leg mostly reddish brown; wing membrane light brown infumated, slightly darker along costal margin. Dorsal portion of T1 violet; T2-T3 greenish violet on central portion of disc and coppery red laterally; T4-T5 progressively more extensively coppery red, with the greenish violet restricted to central portion of disc; T6 entirely coppery red; S2 mostly light reddish brown; S3–S6 mainly coppery red, with violet reflexes basally. Pubescence: labrum and face densely covered with erect, simple setae; those on face with distinctly curved apex; mostly brown on labrum and pale yellow on clypeus and lower half of frons; setae on upper frons and vertex dark brown to black; longest setae on labrum ca. 0.34, those on clypeus about 0.36-0.44 and those on vertex about 0.55–0.65; plumose pubescence restricted to antennal scrobe and a few scattered setae along the parocular area. Mesosoma with mostly dark brown to black pubescence. Pubescence on basal half of horizontal portion of T1 with distinctly long and mostly simple setae; posterior portion of T1 and T2–T3 covered with erect and mostly very short simple setae; most of T4 and entire T5-T6 with distinctly long setae, with a few shorter setae intermingled. T1, disc of T2 and central portion of disc of T3 covered with black setae. Lateral portions of T2, most of T3 and entire T4–T6 with conspicuous bright yellow setae. Disc of S1 with mostly brown pubescence; S3-S6 covered with simple, erect yellow setae. Integumental surface: clypeus and frons densely and uniformly punctate, punctures coarse and separated by 0.3-0.5 pd, those on upper frons slightly larger and distinctly deeper than those on clypeus and lower parocular area; clypeal medial ridge very low and slightly wider than one puncture diameter. Upper gena with only large, slanting punctures (0.5–2 pd), interspaces smooth; mid and lower portions with very small punctures interspersed. Mesoscutum densely punctate, with larger punctures about thrice the size of the smaller ones; anterior and posterior thirds with large punctures separated by 1-4 pd, and smaller punctures about 0.5–2 pd; on mid portion, punctation distinctly denser, smaller punctures about one-half the size of larger ones. Scutellum with very dense punctation; anterior two-thirds with large punctures separated by 0.5-2 pd and smaller ones by less than 0.5 pd; punctures on posterior portion deeper and contiguous. Surface of corbicula entirely micropunctate, with very sparse and irregularly distributed large punctures. T1 with coarse and irregular punctures on the anterior one third, becoming much finer and regular toward posterior margin (<0.5 pd); T2 with relatively coarse punctures, about as large as those on clypeus, denser and slightly smaller on base of disc, becoming larger and slightly sparser toward posterior margin of disc (separated by 0.5-2 pd) and larger and denser on lateral portions (separated by less than 0.5 pd); T3-T6 with gradually larger and denser punctures. Structure (measurements in mm): Head about 1.4x wider than long (6.0:4.2); face relatively flat, with antennal scrobe shallow and short, its upper border not differentiated laterally; clypeus uniformly convex, about 1.7x wider than long (2.84:1.64); ocello-orbital distance, in dorsal



Figs. 1–5. Eufriesea pyrrhopyga sp. nov., female holotype. 1, Habitus, lateral view. 2, Head, frontal view. 3, Head, dorsal view. 4, Details of metasoma, dorsal view. 5, Hind tibia, lateral view. Scale bars: 3 mm. Figs. 2 & 4, and 3 & 5, respectively, at same scale.

view, about 0.75x the distance between posterior ocelli (0.70:0.92); scape, excluding radicle, about 5.5x longer than its maximum width (1.56:0.28); tongue in repose reaching posterior margin of mesepisternum. Scutellum about 2x wider than long (4.0:1.84); hind tibia with anterior edge about 1.6x longer than the maximum width (4.0:2.4).

Type material. Female holotype: "Recife – PE\23-II-1994\ AVF Lopes\\ em Clusia\ nemorosa\ Dois Irmãos" "Holotype\ Euplusia F\ iopyrrha\ J. S. Moure 1995". Paratype: 1 female "Recife – PE\23-II-1994\ AVF Lopes\\ em Clusia\ nemorosa\ Dois Irmãos" "Euplusia\ sp. n.\ Det. Camargo, 199\\ near rufocauda Kimsey".

Etymology. This species is named for the red color present in the last terga, from the greek *pyrrhos*, red, flame-colored plus *pyge*, rump, buttocks.

DISCUSSION

Ten species of *Eufriesea* were recognized by Nemésio (2009:17) for the fauna of orchid bees of the Brazilian Atlantic Forest. This number, however, is certainly underestimated since some of the species treated by Nemésio (2009) as junior

synonyms of *E. auriceps* (Friese, 1899) constitute distinct valid species (Moure *et al.* 2007) and there are additional forms of the auriceps group that remain undescribed (G. Melo, unpublished). On the other hand, Nemésio (2009) has rightfully excluded from the fauna of the Atlantic Forest *E. concava* (Friese, 1899), *E. duckei* (Friese, 1923) and *E. superba* (Hoffmannsegg, 1817), species formerly considered by previous authors (principally Kimsey 1982 and Moure *et al.* 2007) as inhabiting this biome. Also, as stated by Nemésio (2008), the records of *Eufriesea ornata* (Mócsary, 1896) in the Brazilian Atlantic Forest presented by Moure *et al.* (2007) correspond to a distinct form, recognized by him as a new species, *Eufriesea atlantica* Nemésio, 2008, a position followed here.

A fourth species of *Eufriesea*, *E. purpurata*, was also removed by Nemésio (2009) from the fauna of the Brazilian Atlantic Forest. This species is most abundant in northern South America, with the northern limit of its distribution in Costa Rica and Panama, and in the south reaching Bolivia, Paraguay and southeastern Brazil (Kimsey 1982). It has been previously recorded from Atlantic forest sites by Kimsey (1982) and Singer & Sazima (2004), and was included as a part of the fauna of this biome in the compilations by

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Peruquetti *et al.* (1999), Silveira *et al.* (2002), Neves & Viana (2003) and Moure *et al.* (2007). Since *E. purpurata* and *E. pyrrhopyga* **sp. nov.** are closely related, we present here new records, based on specimens deposited at DZUP (see Appendix), that confirm the presence of *E. purpurata* in the Atlantic forest. Considering the small number of specimens collected and that these records are at least 30 years old, it is reasonable to assume that the species is unlikely to be found in most of its former distribution within the Atlantic forest.

The new species of *Eufriesea* described here is also likely to be under threat of extinction. The only two known specimens were collected in 1995 at "Reserva Florestal de Dois Irmãos", a 370 ha fragment of Atlantic forest immersed in a densely populated area in Recife, Pernambuco (Machado et al. 1998; Cavalcanti & Milanez 2007; Souza et al. 2009). It is noteworthy that no species of Eufriesea, which could be confused with the new species herein described, was collected in surveys carried out in forest fragments of northeastern Brazil near Recife (Bezerra & Martins 2001; Milet-Pinheiro & Schlindwein 2005; Darrault et al. 2006; Farias et al. 2008). Darrault et al. (2006) surveyed twelve fragments in the Pernambuco endemism center, in the states of Pernambuco and Alagoas, and the only species of Eufriesea collected by them was Eufriesea mussitans (Fabricius, 1787). Nevertheless, it is also possible that males of this new species are not attracted to the most commonly used fragrance baits. The two type specimens are females captured while collecting resins in flowers of Clusia nemorosa G. Mey. (Lopes & Machado 1998).

Anyhow, as recently argued by Nemésio (2010) for the newly described orchid bee species *Eulaema felipei* Nemésio, it is inevitable to suggest that *E. pyrrhopyga* **sp. nov.** is another example of a highly endangered species of the Pernambuco endemism center. Only 5% of the original Atlantic Forest cover remain and the little left is very sparsely distributed in small fragments (Silva & Tabarelli 2000; Tabarelli *et al.* 2006). We hope that additional fieldwork reveals thriving populations of this new orchid bee and that this contribution does not represent a description of an already extinct species.

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Appendix. Label data of DZUP specimens of Eufriesea purpurata collected in Atlantic Forest sites.

São Paulo: 1 male, "Sousas| Campinas, SP\./XII/1976| I. Sazima" "18" "Eufriesea M\ purpurata\ (Mocs.)"; 1 male, "São Paulo. SP.\ 21.VIII.1967\ Leg. M. C. Arcanjo" "Euplusea [sic]\ purpurata?\ Det. Pe. Moure" [not Moure's handwriting]; 1 male, "2372" "Sao Paulo -\ S.P. - Água Fun-\ da. 21.VIII.1967\ M. H. Costa\\ Curso\ D. Z."). Espírito Santo: 1 male, "S. Mateus\ ES - Brasil\ 12-XII-68\ C. T. Elias" "Eufriesea M\ purpurata\ (Mocs.)\ J. S. Moure det". The specimen from Espírito Santo is placed in *E. purpurata* with reservation, since it differs from the remaining specimens in a number of details. It resembles the female of *E. pyrrhopyga* sp. nov. in general integument color and pattern of tergal punctation. Considering the scarcity of available material and that the specimen come from a distantly placed locality, we refrain here from treating it as the male of *E. pyrrhopyga* sp. nov. until further material from the intervening regions becomes available for study.