

SCIENTIFIC NOTE

Occurrence of *Eulaema (Apeulaema) pseudocingulata* Oliveira (Hymenoptera: Apidae: Euglossini) in the Platina Basin, Mato Grosso State, Brazil

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Ocorrência de *Eulaema (Apeulaema) pseudocingulata* Oliveira (Hymenoptera: Apidae: Euglossini) na Bacia Platina, MT

RESUMO - Em um estudo conduzido no Parque Nacional da Chapada dos Guimarães e na Província Serrana de Mato Grosso, iscas-odores foram utilizadas de maio de 2003 a julho de 2005 para atrair machos de Euglossini. Um total de 498 machos foi capturado, dos quais 38 eram machos de *Eulaema (Apeulaema) pseudocingulata* Oliveira. Foram capturados 29 machos no parque nacional e nove machos na Província Serrana. *E. pseudocingulata* foi recentemente descrita e, antes do presente trabalho, relatada como endêmica da Bacia Amazônica. Todavia, na Bacia Platina, ocorre em simpatria com *E. cingulata* (Fabricius), espécie similar na morfologia e no padrão de coloração, mas com ampla distribuição geográfica.

PALAVRAS-CHAVE. Apinae, abelha das orquídeas, distribuição geográfica, *Eulaema cingulata*

ABSTRACT - This study was conducted in the Chapada dos Guimarães National Park and in the Província Serrana of Mato Grosso state, from May 2003 to July 2005 and involved the use of chemical baits to attract male orchid bees. A total of 498 males were captured, of which 38 were *Eulaema (Apeulaema) pseudocingulata* Oliveira. Twenty-nine of these were collected in the national park and nine in the Província Serrana. *E. pseudocingulata* was reported as endemic to the Amazon Basin, however in the Platina Basin the species is sympatric to *E. cingulata* (Fabricius), a sibling species of similar morphology and color pattern but with a broader geographic distribution.

KEY WORDS: Apinae, orchid bee, geographic distribution, *Eulaema cingulata*

Brazil and Colombia report the highest diversity of orchid bee species in the world, with 117 and 116 species, respectively (Moure 2000, Roubik 2004, Ramírez 2005, Anjos-Silva & Rebêlo 2006), followed by Peru (79), Venezuela (70) and Panama (69) (Ramírez *et al.* 2002, Roubik & Hanson 2004, Rasmussen & Skov 2006, Oliveira 2006a). There are 208 valid species of euglossine bees presently known to man, 96% of which are free-living.

Of all the free-living genera, the genus *Euglossa* Latreille is the richest in number of species, represented by 113 species (Rebêlo & Moure 1995, Moure & Schlindwein 2002, Roubik 2004, Parra-H. *et al.* 2006) and ranging from Mexico to Argentina. *Eufriesea* Cockerell is the second largest genus of orchid bees, with over 60 described species that range from southern United States and Mexico to northern Argentina (Minckley & Reyes 1996, Búrquez 1997, Ramírez *et al.* 2002, Roubik & Hanson 2004).

The cleptoparasitic genus *Exaerete* Hoffmannsegg

is represented by seven species, ranging from Mexico to southern Argentina (Anjos-Silva & Rebêlo 2006), and *Aglae* Lepeletier & Serville is a monotypic genus that was presumed to occur only in the Amazon Basin (Moure 1964, 1967; Michener 2000, Cameron 2004). However, the range of *Aglae caerulea* Lepeletier & Serville was recently documented in the Basin Platina, increasing its known geographic distribution by approximately 2,400 kilometers southward in South America (Anjos-Silva *et al.* 2006).

The genus *Eulaema* occurs from Rio Grande do Sul (Wittmann *et al.* 1988) (Brazil), Misiones (Argentina) and Paraguay to central Mexico (Moure 2000, Michener 2000, Cameron 2004, Oliveira 2006a). This genus was initially represented by 15 species (Moure 1950, Dressler 1979, Ospina-Torres 1998). Moure (2000) added some new species to the genus, including *E. helvola* Moure from the Brazilian states of Goiás and Mato Grosso, and *E. basicincta* Moure from Peru. Recently, Oliveira (2006b) described three new

species endemic to the Amazon Basin: *E. napensis* Oliveira from Ecuador, *E. parapolyzona* Oliveira from Colombia and Bolivia, and *E. pseudocingulata* Oliveira, a new sibling species to *E. cingulata* (Fabricius). In his study, the author identifies 26 valid species of the genus *Eulaema*.

According to existing literature, the *E. cingulata* occurs from northwest Mexico to Bolivia and southern Brazil, whereas distribution of the *E. pseudocingulata* Oliveira is restricted to the Amazon Basin, Venezuela and Trinidad & Tobago. Both species belong to the subgenus *Apeulaema* Moure (Moure 1950, 2000), however *E. pseudocingulata* belongs to the *polychroma* group and *E. cingulata* to the *nigrita* group (Oliveira 2006a, b). Although several studies have been made in the Neotropical region, as yet none have documented whether the distributional gap within the *polychroma* and *nigrita* groups is a real phenomenon. The aim of this study is to record, for the first time, the presence of *E. pseudocingulata* outside the Amazon Basin.

The research was conducted in three study areas. The first is the gallery forest of the Vêu de Noiva valley in the Chapada dos Guimarães National Park (15°24'21"S – 55°50'12"W), southern Mato Grosso state. The Planalto dos Guimarães is the natural boundary between the Amazon, Platina and Araguaia Basins and represents the extreme northeastern boundaries of the Upper Paraguay Basin, the altitude of which ranges from 300 m to 836 m, with annual rainfall ranging from 1,750 mm to 2,000 mm, and temperatures ranging from 13°C to 30°C (PCBAP 1997). The basement rock in the study area is entirely sandstone. The other two sites were located in the Serra do Quilombo, both located in the Província Serrana, southern Mato Grosso state. The basement rock in this area is limestone, forming a karstic landform comprised of sinkholes, sinking streams and cave passageways, commonly present in soluble rock such as limestone. The first of these sites is the Fazenda Jacobina (16°12'25"S – 57°34'30"W), and the second, the Água Milagrosa sinkhole (16°02'58"S – 57°31'49"W), with an altitude ranging from 600 to 390 m, an annual rainfall from 400 mm to 1,300 mm and temperatures between 15°C and 35°C (PCBAP 1997).

From May 2003 to July 2005, male euglossine bees were collected monthly with an insect collecting net as they arrived at the chemical baits. A total of eight chemical baits were used: benzyl benzoate, 1,8 - cineole, eugenol, vanillin, methyl acetate, methyl cinnamate, methyl salicylate and benzyl acetate. The baits were simultaneously applied to absorbent paper pads from 8:00 am to 4:00 pm, which were suspended from twigs by string 5 m apart and 1.5 m above the ground. The paper pads were replenished every 60 min with 1 ml of chemical to prevent loss due to their volatility. The males collected were placed in a killing jar containing ethyl acetate and then transferred to plastic vials. The specimens were collected as part of an ongoing project concerning the ecology and phylogeny of orchid bees. Voucher specimens of both *E. pseudocingulata* and *E. cingulata* were deposited in the collection of the Departamento de Biologia da Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto-USP, Museu de Zoologia-USP, the entomological collection of the Instituto Nacional de Pesquisas da Amazônia-INPA, while the other specimens were stored in the author's collection.

In the first year, from May 2003 to August 2004 the baits

attracted 392 males distributed among four genera and 24 valid species: *Eulaema* (3 species), *Eufriesea* (3 species), *Euglossa* (17 species) and *Exaerete* (1 species). A single male of *E. pseudocingulata* was collected at the Fazenda Jacobina in September 2003, while six males visited the baits during April, June, September, and December in Água Milagrosa. In the Chapada dos Guimarães National Park, 25 *E. pseudocingulata* males were collected at the baits from January to August 2004. The *E. cingulata* males (n = 2) visited the baits in January 2004 at the Fazenda Jacobina, and in the Chapada dos Guimarães the males (n = 11) visited the baits in October 2003 and from January to April 2004. The *E. cingulata* males (n = 13) and *E. pseudocingulata* males (n = 32) were attracted to eugenol, vanillin, 1,8 cineole and benzyl de benzoate.

In the second year, from May 2004 to July 2005 the baits attracted 106 males distributed among five genera and 13 valid species: *Aglae* (1 species), *Eulaema* (5 species), *Eufriesea* (1 species), *Euglossa* (4 species) and *Exaerete* (2 species). At the Fazenda Jacobina only males of the *Eulaema* and *Exaerete* genera were collected. The *E. cingulata* males (n = 4) visited the baits in February and April 2005. In Água Milagrosa 14 males belonging to five valid species (and three undescribed species) and four genera were collected: *Eulaema* (3 species), *Eufriesea* (2 species), *Euglossa* (1 species), and *Exaerete* (2 species). *E. pseudocingulata* males (n = 2) visited the baits in January and March 2005, and *E. cingulata* males (n = 1) visited the baits in February 2005. In the Chapada dos Guimarães 87 males belonging to 12 valid species (and to several additional, undescribed species) and five genera were collected: *Aglae* (1 species), *Eulaema* (4 species), *Eufriesea* (1 species), *Euglossa* (4 species), *Exaerete* (2 species). A total of 16 males belonged to the genus *Eulaema*. The *E. cingulata* males (n = 9) were collected in October and December 2004 and in January, February, May and July 2005. The *E. pseudocingulata* males (n = 4) were collected in September 2004 and January and July 2005. The *E. cingulata* males (n = 14) and the *E. pseudocingulata* males (n = 6) were attracted only to benzyl acetate in the second year (Anjos-Silva 2006a).

Oliveira (2006a, b) suggested that the geographical distribution of the *E. pseudocingulata* is restricted to the Amazon Basin, however recent records of the species (this paper) have modified that distribution. The results reveal that (i) the geographical distribution pattern of *E. pseudocingulata* is not Guianan-Amazonian as previously maintained by Oliveira (2006a, b); (ii) the data now available (Anjos-Silva 2006b) suggest that their distribution areas even overlap those of *E. cingulata*; (iii) *E. pseudocingulata* has a wider distribution than Oliveira (2006a, b) previously reported; (iv) *E. pseudocingulata* is not a rare species, on the contrary, it is a very common species in the Platina Basin and is more abundant than its sibling *E. cingulata*; (v) this gap is a consequence of the poor knowledge on the cerrado euglossine fauna. For example, the distribution of *E. pseudocingulata* may be larger than presently understood owing to poor sampling in the cerrado and pantanal wetlands (Anjos-Silva 2006b). These two biotas constitute geographical gaps and the distribution of *E. pseudocingulata* may eventually be discovered to extend further southward (e.g., southern Brazilian forests). Nonetheless, further biological studies on the species will either confirm or refute this suspicion.

Before the present study, the presence of *E. pseudocingulata* had not been reported in the Platina Basin, where this species occurs in sympatry with *E. cingulata*, a species described by Fabricius in the early XIX century. Therefore, although the presence of *E. pseudocingulata* in the Chapada dos Guimarães National Park and Província Serrana of Mato Grosso may be seen as surprising, its occurrence there represents just one more example of the Amazon forest's influence in the composition of the Cerrado domain fauna.

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