SCIENTIFIC NOTE

First Record of *Eulaema helvola* Moure (Hymenoptera: Apidae: Euglossina) for the State of Minas Gerais: Biogeographic and Taxonomic Implications

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Primeiro Registro de *Eulaema helvola* Moure (Hymenoptera: Apidae) em Minas Gerais: Implicações Biogeográficas e Taxonômicas

RESUMO - A ocorrência de *Eulaema helvola* Moure em Minas Gerais é registrada pela primeira vez, estendendo sua distribuição geográfica conhecida em cerca de 600 km para sudeste e sugerindo que a espécie pode ser parapátrica ou simpátrica com *E. seabrai* Moure. As implicações taxonômicas e biogeográficas desse registro são discutidas.

PALAVRAS-CHAVE: Abelha euglossina, distribuição geográfica, *Eulaema seabrai*

ABSTRACT - The occurrence of *Eulaema helvola* Moure in the state of Minas Gerais, southeastern Brazil, is reported for the first time, extending its known geographic distribution in ca. 600 km eastwards and suggesting that this species may be parapatric or sympatric with *E. seabrai* Moure. Taxonomic and biogeographic implications of this finding are discussed.

KEY WORDS: Brazil, *Eulaema seabrai*, geographic distribution, orchid bee

Since aromatic compounds were discovered and artificially synthesized (Dodson *et al.* 1969) to attract male orchid bees (Hymenoptera: Apidae: Euglossina), many species then rare in entomological collections were collected in large numbers, filling the gaps in their geographic distributions. However, some species are not commonly attracted to the baits traditionally used in orchid-bee inventories (see comments on this subject in Moure 1999 and Nemésio & Silveira 2004). Most of these remain rare in collections and museums and our knowledge about them also remains scarce. Some species are only known for a single or a few specimens and almost no data besides the locality where they were collected are known. *Eulaema* (*Eulaema*) *helvola* Moure is one such species. It is only known for eleven specimens from Brazil, all in the Cerrado domain (Brazilian savanna): two from state of Mato Grosso (Oliveira 2000, Moure 2003), seven from state of Goiás (Oliveira 2000) and two from Distrito Federal (Oliveira 2000). An additional specimen is known from Bolivia, presumably from El Beni (Oliveira 2000).

E. helvola was only recently described (Moure 2003). Its holotype, a male collected by R. Spitz in 1935 in Campinas (now part of the city of Goiânia, Goiás), was among the paratypes of *Eulaema* (*Eulaema*) *seabrai* Moure. Recently, Oliveira (2000) also recognized it as a distinct species. The only difference found by these authors between *E. seabrai* and *E. helvola* was the coloration of the setae of the three last terga, which are red in *E. seabrai* and pale yellow in *E. helvola* (see color pictures in Moure 2003). Moure (2003) even mentioned that he hesitated in considering this a separate species. Oliveira (pers. comm.) considers these species as distinct taxa [as well as the closely related *E. bennetti* Moure, *E. tenuifasciata* (Friese), and *E. luteola* Moure] due to disjunct geographic distributions, since, according to him, they are only distinguishable for those differences in tergal setae coloration. Interestingly, Oliveira (2000) did not discuss another character he employed in his study, the presence or not of a deep or shalow notch on the arm of the seventh sternum. This character was responsible for grouping *E. luteola* and *E. helvola* as sister groups on one hand and *E. seabrai, E. tenuifasciata* and *E. bennetti* as a separate clade on the other.

The known geographic distributions of *E. seabrai* and *E. helvola* at the time Oliveira (2000) and Moure (2003) published their works were allopatric – *E. seabrai* occurring from the state of Bahia to the state of São Paulo, along the Atlantic Forest domain (but not entering the state of Minas Gerais) and *E. helvola* occurring in Bolivia and Central Brazil, reaching Goiás and the Distrito Federal, in the Cerrado domain, but not entering Minas Gerais. Nevertheless, Nemésio & Silveira (2004) recorded a male *E. seabrai* in Minas Gerais, near the city of Belo Horizonte, expanding its known geographic distribution.

In this paper, the occurrence of *E. helvola* in the Brazilian

state of Minas Gerais is recorded, extending its known geographic distribution in ca. 600 km eastwards and suggesting that this species may be parapatric or sympatric with *E. seabrai*. Taxonomic and biogeographic implications of this finding are discussed.

On April 22nd, 2005 a male *E. helvola* was collected in a small farm near the town of Jaboticatubas (19º33'45"S - 43º41'15"W), MG. This specimen is currently deposited in the Entomological Collection of the Coleções Taxonômicas da Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais. An additional male *E. helvola* was attracted (but not collected) to benzyl acetate in late June in the same place the first one was collected. Jaboticatubas is a 12,000 inhabitant town, situated in the southern portion of the "Cadeia do Espinhaço" mountain range and completely immersed in the "Cerrado".

Although some orchid-bee inventories have been carried out in the Atlantic Forest of Minas Gerais (Peruquetti *et al.* 1999; Nemésio 2003, 2004), only two studies have been conducted in the large area covered by Cerrado vegetation in this state (Nemésio & Faria Jr. 2004, Faria Jr. 2005). As a consequence of the poor knowledge on the Cerrado orchid-bee fauna, it is not possible to state whether or not *E. helvola* is a rare species. It should be stressed, however, that neither Nemésio & Faria Jr. (2004) nor Faria Jr. (2005) recorded this species in their inventories of orchid bees in Cerrado areas, suggesting, at least, that it is not very common.

Nemésio & Silveira (2004) argued that the apparent rarity of some orchid bee species may be an artifact of the methodology currently used to sample these bees, based on the attraction of males to aromatic compounds. However, some species seem not to be attracted to these compounds (see Moure 1999). A typical example is *E. seabrai* and its close relatives, such as *E. helvola* (although our data suggest that this species may be attracted to benzyl acetate in Minas Gerais).

The specimens available to Oliveira (2000) suggested him a quite disjunct geographic distribution for *E. seabrai* and *E. helvola*. Based on this allopatric distribution and on the subtle differences in coloration, Oliveira (pers. comm.) considers *E. seabrai* as an Atlantic Forest species and *E. helvola* as endemic to the Cerrado domain. The recent records of *E. seabrai* (Nemésio & Silveira 2004) and *E. helvola* (this paper) change dramatically that picture (Fig. 1). These findings reveal that: (i) the geographical distribution of *E. seabrai* is not restricted to the core region of the Atlantic Forest domain as once thought; (ii) the geographic ranges of *E. seabrai* and *E. helvola* are not as separate as once thought. The data now available suggest that their distribution areas may contact or even overlap; (iii) *E. helvola* has a much wider distribution than Oliveira (2000) and Moure (2003) could anticipate.

In 1967, Moure described three allopatric *Eulaema* species closely related to *E. seabrai*: *E. bennetti*, *E. luteola*, and *E. mimetica*. In 1986, Kimsey & Dressler considered all these

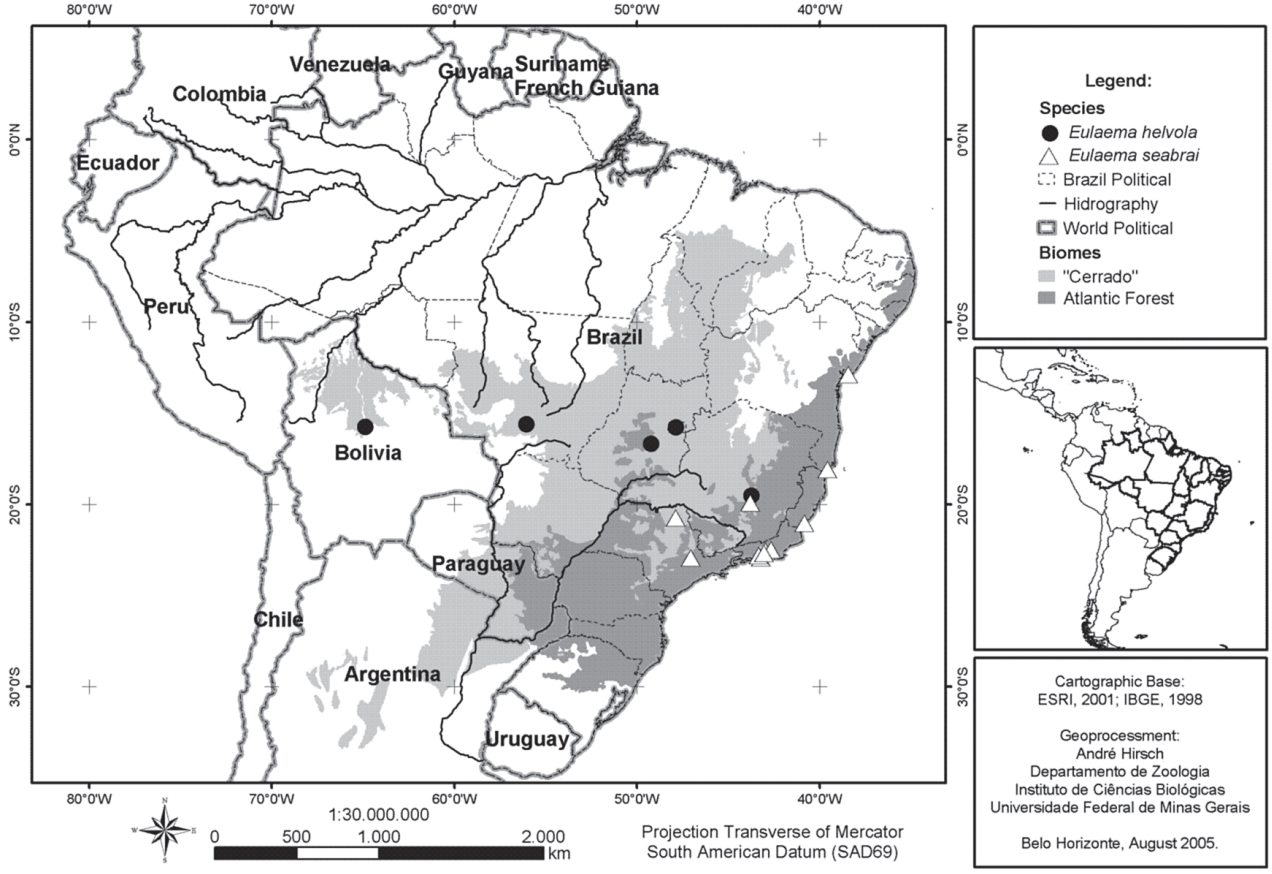

Fig. 1. Current distributions of *E. helvola* and *E. seabrai*.

taxa as subspecies of *E. seabrai*, but Oliveira (2000) and Moure (2003) reaffirmed species status to them (Oliveira treated *E. mimetica* as a junior synonym of *E. tenuifasciata*). The phylogenetic study conducted by Oliveira (2000) suggested that these species constitute a clade (his leucopyga species-subgroup) that also includes *E. helvola, E. leucopyga* (Friese) and *E. bomboides* (Friese). In that study he stated that those five species (*E. bennetti, E. helvola, E. luteola, E. seabrai,* and *E. tenuifasciata*) were very similar to each other and could be distinguished only by subtle differences in coloration (if any) and geographic distributions. However, in the same paper, he found that *E. helvola* and *E. luteola* share a synapomorphy (a shalow notch on the arms of the seventh sternum) which made them appear as sister groups, while *E. seabrai, E. bennetti* and *E. tenuifasciata* possess another apomorphic state of this character (a deep notch) and group together as another branch inside the leucopyga species-subgroup. Unless this character is much more variable than Oliveira (2000) could attest, this would be a stronger argument to give species status to *E. helvola* and *E. seabrai* than the color difference he and Moure (2003) so much stressed.

The similarities among those five species and the record of *E. seabrai* for Goiás (the specimen now treated as *E. helvola*) led Dressler (1979) to consider all them as a single taxon (*El. seabrai*, with geographical races or subspecies) widely distributed from Central America to Southeastern Brazil. He even suggested that "this species may have reached southern coastal Brazil not through Bahia and Espírito Santo, but through Mato Grosso and Goiás". When first recording *E. seabrai* for Minas Gerais, Nemésio & Silveira (2004), however, suggested, based on the phylogenetic tree by Oliveira (2000:138), that "contrary to what Dressler (1979) hypothesized, *E. seabrai* probably did not reach coastal Brazil but originated there", in a vicariance event separating it from *E. tenuifasciata,* probably somewhere along the Brazilian northeastern coast.

The occurrence of *E. helvola* in central Minas Gerais much approximates its known range to that of *E. seabrai* and increases the chances that these species may have originated from a vicariance event occurred in central Brazil. In fact, this recent record of *E. helvola* calls for careful re-evaluation of the taxonomic status and phylogenetic and biogeographic histories of the whole leucopyga species-subgroup (*sensu* Oliveira 2000). The decision on whether or not different morphotypes in this clade are distinct species or mere geographic variants will depend on (i) extensive collecting of specimens throughout the vast region of the Cerrados, including its borders with the Amazonian and Atlantic domains; (ii) the re-evaluation of characters currently used in the definition of the involved taxa and (iii) the search for additional characters that may shed light on the matter. It is then necessary to consider that sampling orchid bees to answer the questions posed above is an urgent task, since the rapid destruction of native vegetation throughout their ranges may create artificial gaps in the geographic distribution of the involved morphotypes.

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