

## Notes on the occurrence of an aberrant coloration in *Eulaema nigrita* (Hymenoptera: Apidae: Euglossina) in forest fragments in Southeastern Brazil

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### Introduction

*Eulaema nigrita* Lepeletier 1841 is a member of the subtribe Euglossina (Hymenoptera: Apidae). Euglossines are Neotropical bees, ranging from Southern United States (Minckley & Reyes, 1996) to Northern Argentina (Zucchi et al., 1969). *Eulaema nigrita* has a wide distribution, ranging from Central America (Ackerman, 1983) to extreme Southern Brazil (Wittmann et al., 1988). It is reputed to be a typical species of open and disturbed areas, since it has been collected in small forest fragments (e.g. Aguilar, 1990; Bezerra, 1995; Neves & Viana, 1997; Peruquetti et al., 1999), in the savanna-like “cerrado”, the so-called “campo rupestre” (Silveira & Cure, 1993), but has not been collected in pristine Amazonian Forest, although it has been collected in nearby open areas, such as Manaus (Morato et al., 1992). On the other hand, *Eulaema nigrita* has also been collected in good numbers in forested areas in the Atlantic Forest region, such as Linhares, Espírito Santo state (Bonilla-Gómez, 1999), João Pessoa, Paraíba state (Bezerra, 1995), Parque Estadual do Rio Doce, Minas Gerais state (Peruquetti et al., 1999), and in northeastern São Paulo state (Rebêlo & Garófalo, 1991, 1997).

In contrast to members of the genera *Aglae*, *Euglossa* and *Exaerete*, which show metallic colors and few hairs, members of *Eulaema* and, to some extent, *Eufriesea*, are hairy bees. *Eulaema nigrita* is a completely black bee, except for some white markings in the face, and the metallic blue terminal terga which are surrounded by brownish yellow hairs. All the remaining hairs are black.

The only reports on color alteration of Euglossina in general (e.g. Moure, 1967; Dressler, 1979), refer to characters shared by a whole population in a given area, i.e., geographic variation, not to individual differences.

The aim of this study is to present a color aberrant of *Eulaema nigrita* which has been collected in very low frequencies in the city of Belo Horizonte and its surroundings.

### Aberrant bees

Recent works on population dynamics and composition of bee faunas have been carried out in small forest fragments (1 to

200 ha) in the Belo Horizonte city region, Minas Gerais state, Southeastern Brazil (Nemésio et al. in preparation). Attractive aromatic compounds were used to attract male euglossines. *Eulaema nigrita* was mostly collected at cineole and vanillin baits, but some individuals were also collected at methyl cinnamate and benzyl acetate. *Eulaema nigrita* was the dominant species in all fragments in this area, its proportion varying between 30% and 70% of the euglossine fauna among fragments.

More than 2,000 *Eulaema nigrita* specimens were collected from April 1997 to February 2000. Among these, three specimens showed a distinctive clear coloration. A normal *Eulaema nigrita* individual is shown in Figure 1. Figures 2 to 4 show the three aberrant specimens. As can be seen in the pictures, the evident alteration in these specimens is the color of the hairs, which changed from the normal black to a light brown.

The first of these brown *Eulaema nigrita* (Figure 2) was collected in 1997, at the ecological station of the Universidade Federal de Minas Gerais, a 156 ha fragment including a forested area surrounded by cerrado (Martins & Almeida, 1994). In this specimen (Figure 2), all black hairs were substituted by brown ones. The other two specimens (Figures 3 and 4) were collected in October 1999 at two forest fragments of the Área de Proteção Especial do Catarina, in Nova Lima town, close to Belo Horizonte city. One of them is a very small forest fragment (ca. 1 ha) connected to the second one (a larger fragment, ca. 70 ha) by a thin forest corridor. These fragments are surrounded by “campo rupestre” vegetation. These two specimens are different from the first one, since the substitution of black hairs by brown ones is not complete. The second aberrant specimen collected (Figure 3) presents brown hairs in all the seven terga, but mixed (black and brown) hairs on the scutellum, head and tibiae. The third specimen (Figure 4), on the other hand, presents brown hairs on the scutellum and head, whereas the seven terga remain predominantly black.

The three specimens mentioned here are deposited in the entomological collection of the department of zoology, at the Universidade Federal de Minas Gerais. The file-numbers of bees in the collection are indicated in the legends of each figure.

### Discussion

Euglossine pigments have never been studied, but it is known that melanin occurs in insects (Vevers, 1982) and it is probable that black coloration of *Eulaema nigrita* hairs are due to melanin.

Received 10.05.2001  
Accepted 07.01.2002

The substitution of black melanin for brown melanin is quite common in vertebrates. This is one of the commonest mutations in psittacine species (Aves: Psittacidae) (see Nemésio 1998, 1999, 2001b for reviews). In birds, the mutants which show brown feathers are called cinnamons. In all bird species where a mutation resembling a cinnamon appeared, a sex-linked recessive gene (in most cases) or an autosomal recessive gene is involved (e.g. Klören, 1983; Vecchio 1999; Nemésio 2001a). This is also true for fish (e.g. Iwasaki, 1989), mammals (Miller, 1991) and reptiles (Obst et al., 1988).

It is possible that the alteration shown here is caused by a mutation. However, many other factors could influence the pattern of coloration, such as the presence of chemicals or differences in temperature during the larval stage, or a somatic mutational event (usually not heritable). Which one is the correct explanation for this aberrant coloration is unknown. However, it

is important to notice that this kind of color alteration had not been formerly assigned to Euglossine bees, and it is quite different from the geographical variations described earlier by Moure (1967) and Dressler (1979). More studies are necessary both to investigate the causes of this colour alteration and to establish the frequency of this kind of diversity in wild populations.

#### Acknowledgements

I am grateful to Dr. Wilmer J. Miller, at the Department of Zoology and Genetics, Iowa State University, and Dr. Fernando Amaral da Silveira, at the Departamento de Zoologia, Universidade Federal de Minas Gerais, for reading and commenting on early versions of this article. To two anonymous referees whose comments were valuable. I am also grateful to Eduardo Andrade Botelho de Almeida for the photographs.



Figure 1 - Typical coloration of a male *Eulaema nigrita*.



Figure 2 - The first aberrant of *Eulaema nigrita*, collected in 1997. (File number: 1784/4989).



Figure 3 - The aberrant *Eulaema nigrita* collected in the smaller fragment of Área de Proteção Especial do Catarina, in 1999. (Not filed yet).



Figure 4 - The aberrant *Eulaema nigrita* collected in the larger fragment of Área de Proteção Especial do Catarina, in 1999. (File number: 5924/16418).

Photos: E. A. B. Almeida

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