

SHORT COMMUNICATION

Small orchid bees are not safe: parasitism of two species of *Euglossa* (Hymenoptera: Apidae: Euglossina) by conopid flies (Diptera: Conopidae) ¹

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ABSTRACT. Here we report for the first time data on parasitism of two species of *Euglossa*, *E. intersecta* Latreille, 1838 and *E. anodorhynchi* Nemésio, 2006, by conopid flies of the genus *Physocephala* Schiner, 1861. A parasitized adult male of *E. intersecta* was collected in Acre, northwestern Brazil, while parasitized adult females of *E. anodorhynchi* were obtained from trap-nests in São Paulo, southeastern Brazil. For both host species, the parasite-host association was confirmed by rearing the flies from parasitized adult bees. *E. anodorhynchi* was attacked by *Physocephala bipunctata* (Macquart, 1843) and *E. intersecta* by an unidentified species of *Physocephala* Schiner, 1861. Although our current knowledge is still incipient, parasitism by conopid flies can be considered widespread in euglossine bees, judging from the cases reported so far, which involve different host genera and species distributed widely apart. **KEY WORDS.** Apinae; Euglossini; *Eulaema*; neotropical; thick-headed flies.

RESUMO. **Abelhas euglossíneas menores não estão a salvo: parasitismo de duas espécies de *Euglossa* (Hymenoptera: Apidae: Euglossina) por moscas conopídeas (Diptera: Conopidae).** Parasitismo de duas espécies de *Euglossa*, *E. intersecta* Latreille, 1838 e *E. anodorhynchi* Nemésio, 2006, por moscas conopídeas do gênero *Physocephala* Schiner, 1861 é relatada pela primeira vez. Um macho adulto parasitado de *E. intersecta* foi coletado no Acre, noroeste do Brasil, enquanto fêmeas adultas parasitadas de *E. anodorhynchi* foram obtidas de ninhos armadilhas em São Paulo, sudeste do Brasil. Para ambas as espécies de hospedeiros, a associação parasita-hospedeiro foi confirmada pela obtenção de moscas adultas a partir de abelhas adultas parasitadas. *Euglossa anodorhynchi* foi atacada por *P. bipunctata* (Macquart, 1843) e *E. intersecta* por uma espécie não-identificada de *Physocephala* Schiner, 1861. Apesar do conhecimento corrente ser ainda incipiente, parasitismo por conopídeos pode ser considerado prevalente entre os euglossíneos, a julgar pelos casos conhecidos até o momento que envolvem hospedeiros de diferentes gêneros e espécies amplamente separados geograficamente. **PALAVRAS-CHAVE.** Apinae; Euglossini; *Eulaema*; neotropical; conopídeos.

Data on the parasites of orchid bees are limited, concentrated on few host species and, in most cases, related to nest parasites (see RAMÍREZ *et al.* 2002). Very little is known about parasites attacking adult orchid bees, the few records related to conopid flies. The relation between conopid flies and orchid bees was first speculated by BENNETT (1966), who suggested that these flies could parasitize some of the larger species of Euglossina. Recently, RASMUSSEN & CAMERON (2004) reported on oviposition attacks of *Physocephala rufithorax* (Kröber, 1915) on males of two species of *Eulaema* Lepeletier, 1841.

Conopidae is a large and widespread family of parasitic flies, and the known larvae of all Conopinae, Myopinae and Dalmaniinae are internal parasites of aculeate Hymenoptera, the female flies carrying out the ovipositing attacks in flight (SMITH

& PETERSON 1987). Conopidae are well-known solitary koinobiont endoparasitoids of social bumblebees (Apidae: Bombina) and significant research has focused on this association in the Nearctic and Palearctic regions (MÜLLER *et al.* 1996, SCHMID-HEMPEL 2001, OTTERSTATTER 2004). Here we present for the first time data on parasitism of two species of *Euglossa*, *E. (Glossuropoda) intersecta* Latreille, 1838 and *E. (Euglossa) anodorhynchi* Nemésio, 2006 by species of *Physocephala* Schiner, 1861.

One male of *E. intersecta*, apparently dead, was found on the underside of a leaf, 1.0 m above ground, along a trail within a forested area at 50 km northwestern of Bujari, state of Acre, Brazil, in July 20-23, 2004. The host bee was in a very characteristic position, with the glossa completely extended forward (Fig. 1). It was collected and put in a small paper bag, taken to the



Figures 1-6. (1) Parasitized male of *E. intersecta*, habitus; (2) parasitized female of *E. anodorhynchi*, habitus; (3) parasitized male of *E. intersecta*, metasoma in dorsal view, arrow indicates the opening between the membrane of terga II and III from which the parasitic fly imago emerged; (4) parasitized female of *E. anodorhynchi*, metasoma in lateral view, arrow indicates the opening at apex of metasoma from which the parasitic fly imago emerged; (5) male of *Physocephala* sp., habitus; (6) female of *P. bipunctata*, habitus. Scales: (1) 10.0 mm, (2, 3, 5 and 6) 2.5 mm, (4) 2.5 mm.

laboratory and pinned. Remarkably, 15 days after being collected, a male imago of *Physocephala* sp. (Fig. 5) emerged from the bee, through the membrane between the terga II and III (Fig. 3).

The parasitized females of *E. anodorhynchi* were found during a more comprehensive study on trap nesting Hymenoptera carried out in an Atlantic Forest area, in Sete Barras, state of São Paulo, Brazil. Two nests established by *E. anodorhynchi* in the study area presented the same pattern: a completely constructed cell near the bottom of the nest, and an incomplete cell, partially provisioned with pollen and not sealed. The first nest was found in February 26 and the second in June 11, 2005. In each nest, an inert female (apparently dead) was found near the entrance of the nest, with the glossa distended forward and with the entire metasoma somewhat stretched (Fig. 2). In both cases, these females were taken from the nest and placed in a glass vial in the laboratory. A month after collecting, an imago of *Physocephala bipunctata* (Macquart, 1843) emerged from the metasoma of the bee in the nest found in February. In the second nest, only three months after collecting (September 10) did a female imago of *P. bipunctata* (Fig. 6) emerge from the female metasoma. In the two cases, the imago fly emerged from the host female by the apex of the bee's metasoma (Fig. 4).

It is outstanding that in the cases reported here, the host bees did not dig themselves into the ground as occurs with many species of bumblebees (see SCHMID-HEMPEL 2001).

Our findings shed light to some of the questions posed by RASMUSSEN & CAMERON (2004) regarding parasitism of orchid bees by conopid flies. The first one concerns the putative preference for relatively large hosts, as the case of *Physocephala rufithorax* preference for the larger *Eulaema* (ca. 18-31 mm) despite the higher abundance of the smaller *Euglossa* (ca. 9-19 mm) in their study site. The data presented here, however, involves parasitism of middle-sized (*E. intersecta*) and small-sized (*E. anodorhynchi*) orchid bees, and therefore conopids attacking euglossine bees are not restricted to the larger host species.

Conopids may show a preference for social, or rudimentarily social species such as *Eulaema* (RASMUSSEN & CAMERON 2004) what seems to be consistent, since there is a large amount of data on parasitism of social bees by these flies (e.g. MÜLLER *et al.* 1996, SCHMID-HEMPEL 2001, OTTERSTATER *et al.* 2002, OTTERSTATER 2004). Nevertheless, we have no evidence pointing out to social interactions in *E. intersecta* (see ZUCCHI *et al.* 1969) or in *E. anodorhynchi* and, therefore, parasitism of solitary species should be included as part of the interactions between bees and conopid flies. RASMUSSEN & CAMERON (2004) also suggested the possibility that the interactions between *Physocephala* and *Eulaema* could be casual, since there was a colony of bumblebees near their study site. The data presented here, however, confirm successful parasitism by conopids on euglossine hosts.

Although our current knowledge is still incipient, parasitism by conopid flies can be considered widespread in euglossine bees, judging from the cases reported so far, which involve different host genera and species distributed widely apart. New host

records are likely to be found as parasitized adult bees, usually simply assumed to be dead by natural causes, are closely examined for parasite presence. It is remarkable that parasitized bees do not have the characteristic smell of decomposing dead insects. Together with a stretched metasoma, this feature could be used as a clue for detecting conopid parasitism in euglossine bees.

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