SHORT COMMUNICATION

First host record for the cleptoparasitic bee *Rhathymus friesei* Ducke (Hymenoptera, Apidae)

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ABSTRACT. First host record for the cleptoparasitic bee *Rhathymus friesei* Ducke (Hymenoptera, Apidae). The genus *Rhathymus* contains only obligatory cleptoparasitic species whose hosts belong to the genus *Epicharis* (Apidae, Centridini). Host information is available for only four of the 20 species of *Rhathymus*. In this note a new host record is added, in which the parasitism by *R. friesei* on nests of *Epicharis (Epicharoides) picta* is documented.

KEYWORDS. Centridini; Cleptoparasitism, Rhathymini.

RESUMO. Primeiro registro de hospedeiro para a abelha cleptoparasita *Rhathymus friesei* (Hymenoptera, Apidae). O gênero *Rhathymus* é composto apenas por cleptoparasitas obrigatórios cujos hospedeiros conhecidos pertencem todos ao gênero *Epicharis* (Apidae, Centridini). Para apenas quatro das 20 espécies válidas havia previamente registro de hospedeiros. O presente trabalho documenta, pela primeira vez, o parasitismo de *Rhathymus friesei* sobre o hospedeiro *Epicharis (Epicharoides) picta*.

PALAVRAS-CHAVE. Centridini; Cleptoparasitismo; Rhathymini. *Rhathymus*.

Rhathymus Lepeletier & Serville, 1828, the single genus in the tribe Rhathymini, contains about 20 species restricted to the Neotropical region (Moure & Melo 2007). All species in the tribe are obligatory cleptoparasites and only bees in the genus *Epicharis* Klug, 1807 (Apidae, Centridini) have been recorded as their hosts (Vesey-FitzGerald 1939; Rozen 1969, 1991; Camargo *et al.* 1975; Raw 1991, 1992; Hiller & Wittmann 1994; Gaglianone 2005; Michener 2007; Rocha-Filho *et al.* 2008). The species of *Epicharis* are soil-nesting solitary bees, which use floral oils and exhibit a close association with the plant family Malpighiaceae (Gaglianone 2003, 2005; Rocha-Filho *et al.* 2008; Sigrist & Sazima 2004; Alves-dos-Santos *et al.* 2007).

Little is known of the biology of *Rhathymus*. Available evidence indicates that the females introduce their eggs in closed brood cells of the host bees (Camargo *et al.* 1975), therefore corresponding to the mode of parasitism in which the female cleptoparasites invade host nests containing recently sealed brood cells and open the cell closures for egg laying (Rozen 1991, 2000, 2003). Similar to other bee groups exhibiting the same mode of parasitism, the eggs of *Rhathymus* are relatively large and comparable in size to the host eggs (Rozen 2003). First instars have sharp mandibles (Camargo *et al.* 1975) and are assumed to kill the host egg or young larva (Rozen 2000).

Host information is available for only four of the 20 species of *Rhathymus*. Two of them, *R. bicolor* Lepeletier & Serville, 1828 and *R. unicolor* (Smith, 1854), are known to attack more than one host species (Table I). The present work constitutes the first host record for *Rhathymus friesei* Ducke, 1907, observed attacking nests of *Epicharis (Epicharoides) picta* (Smith, 1874), and therefore contributes new information to the understanding of the relationships between species of the bee tribes Rhathymini and Centridini.

Rhathymus friesei, described originally from Minas Gerais, in Brazil (Moure & Melo 2007), is also known from São Paulo (G.A.R. Melo, unpublished). This species was synonymized by Engel *et al.* (2004a) under *R. acutiventris* Friese, 1906, and despite their similarity, *R. friesei* constitutes a separate valid species (Melo, unpublished). These two species, together with *R. bertonii* Schrottky, 1920 and additional undescribed species, constitute a distinct group within the genus. This species group was placed in a separate genus, *Nannorhathymus*, by Engel *et al.* (2004a, b), whose recognition leaves a non-monophyletic *Rhathymus* (G.A.R. Melo, unpublished).

The observations on *R. friesei* were conducted in a nest aggregation of *E. picta* (20°47'56" S, 42°52'07" W) found in a site near one of the largest forest remnant, known as "Mata do Paraíso", in the municipality of Viçosa, Minas

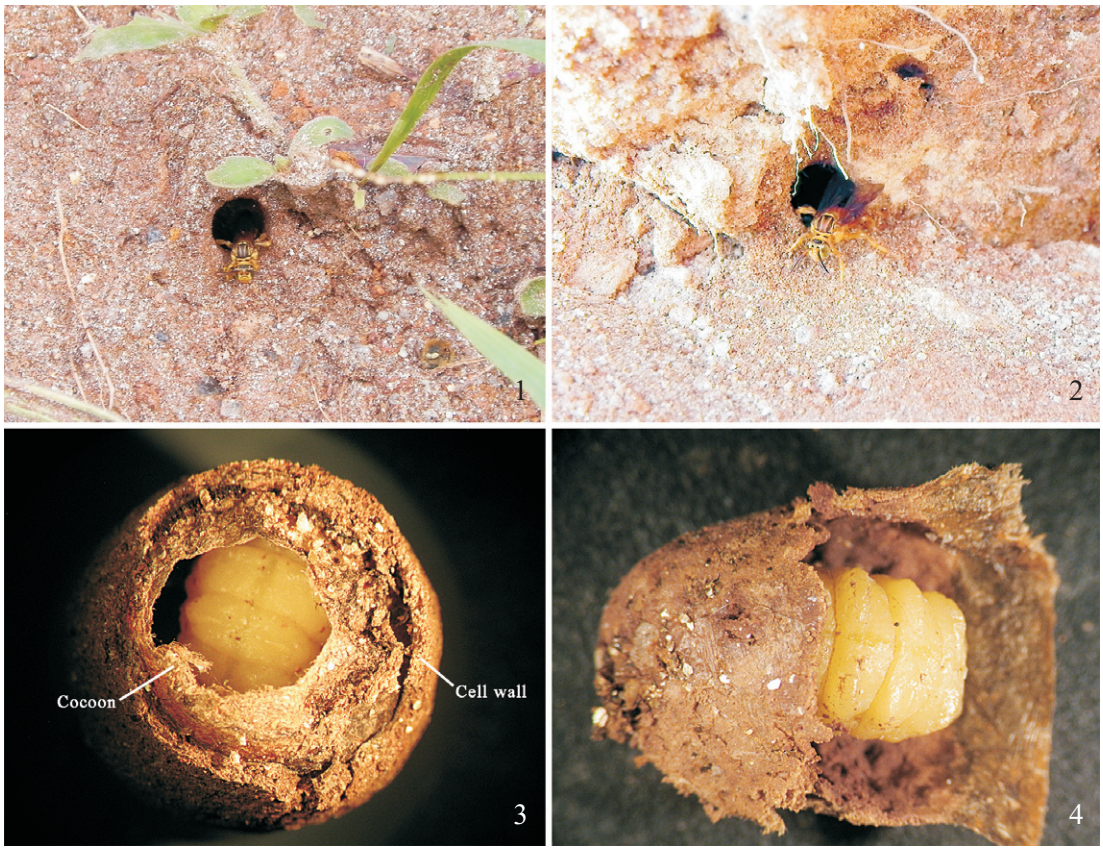
Gerais. The nest aggregation was studied during two consecutive seasons, from January through May, in 2010 and 2011. Vouchers of the studied bees are deposited in the Museu Regional de Entomologia, from the Departamento de Entomologia of the Universidade Federal de Viçosa (MEUFV), and in the Coleção Entomológica Pe. J. S. Moure from the Departamento de Zoologia of the Universidade Federal do Paraná, Curitiba (DZUP).

Rhathymus friesei was active in the nest aggregation between February and March, in both years of study. The cleptoparasite was repeatedly observed coming in and out of the nests of *E. picta* (Figs. 1–2), with up to four adult bees found in the nest aggregation at once. Females of *R. friesei* would fly over the nest aggregation, usually at a height of about 30 to 50 cm above ground, and after selecting a given nest, they would land in front of its entrance and walk in. In most cases, the cleptoparasite would invade nests in which the host female was temporarily out. Time spent by adult *R. friesei* within the host nests, measured on five occasions, lasted 1.5 to 25 min. In some occasions, the cleptoparasite would enter a nest in which the host female was present and would be promptly expelled by her. Also, some specimens were observed landing in the plant foliage around the nest aggregation near the end of the day (6:00pm), probably in search of sleeping sites.

A total of 42 brood cells containing mature larvae were dug from the nest aggregation, 38 of them belonging to *E. picta* (89.5%) and four to *R. friesei* (10.5%). As in other studied species of *Rhathymus* (Rozen 1969; Camargo *et al.* 1975), and contrasting with *Epicharis*, larvae of *R. friesei* spin cocoons (Figs. 3–4).

Although the aggregation contained predominantly nests of *E. picta*, a few nests of *Epicharis (Epicharoides) albofasciata* Smith, 1874 were also found among them. No direct or indirect evidence was obtained indicating that *R. friesei* parasitized this other species of *Epicharis*. Since the adults of *E. albofasciata* are only slightly smaller than those of *E. picta*, it might be possible that the former species could also serve as host of *R. friesei*.

The host records currently known for *Rhathymus* (Table I) do not point to any clear pattern of host specificity. However, considering that the different species groups within *Rhathymus* vary considerably in body size, it would be expected that the smaller cleptoparasitic species, such as *R. friesei* and relatives, would be associated with the subgenera of *Epicharis* containing smaller body-sized species, like *E. (Epicharoides)* and *E. (Epicharitides)*, and perhaps *E. (Cyphepicharis)*. The new host record here documented between *R. friesei* and *E. picta* corroborates this expected pattern.



Figs. 1–4. *Rhathymus friesei* found parasitizing nests of *Epicharis picta* in Viçosa, Minas Gerais. 1–2, Adult females of *R. friesei* coming out of nests of *E. picta*. 3, Partly open host cell showing a mature larva of *R. friesei* within its cocoon. 4, Open cocoon partly showing a mature larva of *R. friesei*.

Table I. Known host associations for cleptoparasitic bees of the tribe Rhathymini.

Cleptoparasites	Hosts	Type of evidence[1]	References
Rhathymus ater (Smith, 1854)	*Epicharis* (*Anepicharis*) *dejeanii* Lepeletier, 1841	Direct	Hiller & Wittmann (1994)[2]
R. bicolor Lepeletier & Serville, 1828	*Epicharis* (*Epicharana*) *rustica* (Olivier, 1789)	Direct	Rozen (1969)
	E. (*Epicharis*) *bicolor* Smith, 1854	Indirect	Rocha-Filho *et al.* (2008)
	E. (*Epicharis*) *nigrita* Friese, 1900	Indirect	Gaglianone (2005)
R. friesei Ducke, 1907	*Epicharis* (*Epicharoides*) *picta* (Smith, 1874)	Direct	This study
R. trinitatis Cockerell, 1935	*Epicharis* (*Hoplepicharis*) *fasciata* Lepeletier & Serville, 1828	Direct	Vesey-FitzGerald (1939); Rozen (1969)
R. unicolor (Smith, 1854)	*Epicharis* (*Anepicharis*) *dejeanii* Lepeletier, 1841[3]	Indirect	Raw (1992)[4]
	E. (*Epicharis*) *bicolor* Smith, 1854	Indirect	Rocha-Filho *et al.* (2008)
	E. (*Epicharis*) *nigrita* Friese, 1900	Indirect	Gaglianone (2005)[5]
	Epicharis (*Triepicharis*) *analis* Lepeletier, 1841	Indirect	Raw (1991, 1992)[4]
Rhathymus sp.	*Epicharis* (*Epicharana*) *flava* Friese, 1900	Direct	Camargo *et al.* (1975)

1. Type of evidence: Direct, when larvae of the cleptoparasite have been reared from the host brood cells; Indirect, when only adult cleptoparasitic bees have been observed in the nesting areas of the putative host.
2. Cited as *'Rhathymus niger'* nomen nudum and *Rhathymus* n. sp., but vouchers at DZUP correspond to *R. ater*.
3. Cited as *Epicharis melanoxantha*.
4. Cited as *Rhathymus fulvus*; however, specimens deposited in DZUP identified by A. Raw as *R. fulvus* correspond to *R. unicolor*.
5. Cited as *Rhathymus* sp., but voucher specimens examined by G. Melo correspond to *R. unicolor*.

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