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SHORT COMMUNICATION

Nests of *Phacellodomus rufifrons* (Wied, 1821) (Aves: Furnariidae) as sleeping shelter for a solitary bee species (Apidae: Centridini) in southeastern Brazil

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Abstract

Sleeping shelters for male *Centris* (*Trachina*) *fuscata* Lepeletier, 1841 (Hymenoptera, Apidae, Centridini) were found in nests of the ovenbird *Phacellodomus rufifrons* (Wied, 1821) (Furnariidae) in an area of Cerrado (Brazilian savanna), in the state of Minas Gerais, southeastern Brazil, in September 2003. Each day, male bees departed from the shelter early in the morning, returning to them late in the afternoon. Interactions among males were aggressive when two or more males returned simultaneously to the shelter, and lasted until all of them had either occupied a shelter inside the nest stick-matrix or left the nest proximity. Nests occupied by bird families apparently were preferred by bees, as well as those located nearest to a massive food source, a flowering tree *Bowdichia virgilioides* Kunth, 1823 (Fabaceae). This note emphasizes a very uncommon type of sleeping shelter and its importance for bees.

Keywords: *Centris (Trachina)*, sleeping shelter, male aggregation, Brazilian savanna.

The Rufous-fronted Thornbird *Phacellodomus rufifrons* (Wied, 1821) (Furnariidae) is a Neotropical, endemic, ovenbird and one of the commonest species of southeastern Brazilian open scrubland (Sick, 1993; Carrara & Rodrigues, 2001). It builds one of the largest nests among Neotropical ovenbirds (Fig. 1), up to 2 m long and 0.4 m wide (Thomas, 1983). These nests are usually established in exposed sites, always hanging from the extremities of thin branches of isolated trees (Sick, 1993; Carrara & Rodrigues, 2001). Each nest is composed of thousands of dry and often thorny, tightly interlaced woody sticks that sustain and protect the nest against predators (Thomas, 1983; Sick, 1993). Their abandoned nests are used by other bird species, lizards, small snakes, toads and small forest rats (Sick, 1993). Nests of furnarids also shelter a rich arthropod fauna of small beetles, cimicid bugs, flesh flies, wasps, forest cockroaches, mites, spiders, pseudoscorpions and millipedes (Sick, 1993; Bar et al., 1999). There is also an eusocial bee species, *Partamona helleri* (Friese, 1900) (Apidae), that commonly uses abandoned nests of the Rufous-fronted Thornbird as substrate for their own nests (Camargo & Pedro, 2003).

Sleeping habits of male Hymenoptera have been reported for a long time (e.g. Banks, 1902) and sleeping aggregations were described in detail by Evans & Linsley (1960) and Linsley (1962) for many wasp and bee species, which generally use stems of dry-rigid or dead plants, called sleeping plants. Such aggregations have been reported for a number of different bee groups worldwide, such as *Idiomelissodes duplocincta* (Cockerell, 1905) (Apidae, Eucerini) in the United States (Alcock, 1998), *Oxaea austera* Gerstaecker, 1867 (Andrenidae, Oxaeinae) in Brazil (Oliveira & Castro, 2002) and *Augochlorella neglectula* (Cockerell, 1897) (Halictidae, Augochlorini) in Panamá (Wcislo, 2003). To the best of our knowledge, there is a single observation of sleeping aggregation for the Centridini

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(Apidae), referring to *Centris adani* Cockerell, 1949 in Costa Rica (Frankie, et al., 1980).

Species of *Centris* in the subgenus *Trachina* Klug are widespread in Brazil (Silveira et al., 2002) and across the Neotropical region (Snelling, 1984). Females of *Centris fuscata* Lepeletier, 1841 dig their nests into the soil (Camillo et al., 1993), where they possibly dwell at least during the nesting, provisioning and/or egg-laying periods. However, sleeping shelters of male *Trachina* were unknown until now. This note describes, for the first time, the use of active bird nests as sleeping shelters for solitary male bees.

Fieldwork was carried out between September 23 and 25, 2003 in a well preserved area of Cerrado (Brazilian savanna) in the Parque Estadual do Rio Preto (18°07'S; 43°20'W), located in the municipality of São Gonçalo do Rio Preto, state of Minas Gerais, southeastern Brazil, in the Serra do Espinhaço range.

Four nests of the ovenbird *P. rufifrons* were observed. Two of them (one abandoned and one occupied by three birds) were hanging from a blooming tree *Bowdichia virgilioides* Kunth, 1823 (Fabaceae) and the other two (one abandoned and one occupied by four birds) hung from an unidentified tree with no flowers. These trees were about 200 meters apart. Nests were observed between 05:00 and 08:00 and from 16:00 until movement of the bees had ended to record the time when bees left and returned to their overnight shelters. Five bees were collected and pinned for identification. They are deposited in the Entomological Collection of the Taxonomic Collections of the Universidade Federal de Minas Gerais.

Males of *C. fuscata* were recorded in three of the bird nests in three observation days. The first males arrived in the sleeping shelters around 16:45 and others continued to come until 17:45 (just before the resident birds returned). Generally, the bees made a few circular flights around the nests, sometimes hovering in front of them, inspecting the stick matrix. This procedure was faster (9 s to 20 s) when a male approached the nest alone, and slower (about 1 min) when two or more males (up to six were recorded) arrived simultaneously. This was because male arriving together normally engaged in aggressive displays, bumping in the air before managing to enter the nest wall. Individuals already occupying empty spaces among the twigs were observed being expelled by other males arriving afterwards and, in other instances, recently-arriving males were deterred by those previously sheltered. No estimate could be made of how many males a nest could hold. It is not known, also, if all bees arriving at a given nest would get a place to sleep or whether part of them would go away in search of shelter elsewhere. In the morning, males departed individually between 5:30 and 7:00. Interactions among birds and bees were never observed.

No quantitative data were recorded since bees flew out too fast in the morning and also exhibited complex flight maneuvers when returning, preventing precise counting of individuals and timing of these behaviors. However, the following rank in activity intensity at each sleeping shelter could be noticed: active bird nest on massive flowering tree > active bird nest on tree without flowers > abandoned nest on massive flowering tree > abandoned nest on tree without flowers (without activity).

A daily cycle at the aggregation site was similar to that observed by Frankie et al. (1980) for *C. adani* in a dry-forest area. According to them, bees began dispersing individually from the sleeping shelter in early morning and returning to it in late afternoon. They also verified a high turnover rate for males in the sleeping aggregation. Here however, we cannot assume that the same individuals return to the same bird nest because no males were marked.

Figure 1 - Nest of the Rufous-fronted Thornbird *Phacellodomus rufifrons* (Wied, 1821) (Furnariidae).

Our observations suggest that bees may prefer active bird nests as sleeping shelters. Maybe, they are benefited by a warmer environment brought by the presence of birds in the nests, since Ferguson et al. (2002), for example, recorded higher temperatures inside than outside the nests of the sparrow-weaver *Plocepasser mahali* Smith, 1836. However, conclusions should not can be taken without a deeper study.

It also seems that proximity to food source may be an important factor in defining sleeping site choice. During all days, the flowers of *B. virgilioides* were strongly defended by males of *C. fuscata*. Those flowers are highly rewarding nectar sources and are attractive to several bee species, including female *C. fuscata*. Massive-flowering tree species frequently trigger territorial behavior in Centridini males, presumably acting as mating sites (Frankie et al., 1980; Coville et al., 1986). The proximity between the sleeping shelter and such food sources makes food and reproductive sites promptly accessible.

Sleeping aggregations of several non-centridine bee species commonly have been found exposed on plants (e.g. Linsley, 1962, Alcock, 1998; Oliveira & Castro, 2002; Wcislo, 2003). Among the Centridini, males of *C. adani* were also found on

scorched leaves of a shrub and on grass stalks (Frankie et al. 1980). Therefore, nests of the Rufous-fronted Thornbird are not only a previously unknown substrate for sleeping solitary bees, but also an uncommon situation in which aggregations are hidden inside the substrate. We found only another case of male bees hiding inside a structure other then their nests. This was a reference by Moure (1964), regarding small mixed aggregations of males in the colletid genera *Zikanapis* and *Ptiloglossa* resting in dry rolled-leafs hanging on broken sticks during the day.

It is not clear if the use of this bird nests is a common widespread phenomenon or, else, if it is a punctual event. However, considering the widespread distribution and local abundances of *P. rufifrons* nests (Carrara & Rodrigues, 2001), it is possible that they are an important sleeping shelter for *C. fuscata* and, maybe, for other related species, across their geographic ranges. Besides, as new nests are periodically added to the bottom of the old ones and birds use them throughout the whole year for laying or as overnight roostings (Thomas, 1983; Sick, 1993), tenants have a continuous offer of residence or sleeping shelter.

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