

A facultative association between *Plebeia droryana* (Friese, 1900) (Hymenoptera: Apidae: Meliponini) and a wax scale insect, *Ceroplastes janeirensis* (Hemiptera: Coccoidea: Coccidae)

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(With 2 figures)

Ants and bees (Hymenoptera) are frequently associated with scale insects (Hemiptera: Coccoidea) and other Sternorrhyncha in a mutualistic relationship. Associations with ants are best known, and they tend to clean, protect and even transport these insects in exchange for honeydew (Way, 1963).

Studies between coccoids and bees are less common, although in some regions of Europe the associations between *Apis* sp. (Hymenoptera: Apidae) and scale insects are important for honey production (Santas, 1983; Gounari, 2006). In Brazil, the interaction between *Apis mellifera* and *Stigmacoccus* spp. (Coccoidea: Stigmacoccidae) associated to *Mimosa scabrella* (Fabaceae) was studied in relation to the production of molasses in Campos de Cima da Serra, Rio Grande do Sul (Witter et al., 2010).

Camargo and Pedro (2002a, b) reported a new kind of mutualistic association between the Amazonian stingless bee *Schwarzula coccidophila* Camargo and Pedro, 2002 (Hymenoptera: Apidae: Meliponini) and *Cryptostigma* sp. (Hemiptera: Coccoidea: Coccidae) in which the stingless bees not only collect the honeydew, but also the waxy cover produced by the scale insect which they use as an alternative source for construction of their nests. *Schwarzula coccidophila* maintain the scale insect *Cryptostigma* sp. inside their nests providing a safe place for them, far from the reach of natural enemies (Camargo and Pedro, 2002a, b). Camargo and Pedro (2002b) also provided a review of the stingless bees *Schwarzula timida* (Silvestri, 1902) at Caxipó, MT, Brazil and *Plebeia emerina* (Friese, 1900) (at São Paulo, SP, Brazil) associated with unidentified soft scale insect (Coccidae).

The coccid *Cryptostigma* sp. mentioned in association with *S. coccidophila* by Camargo and Pedro (2002a, b) was later described as a new species by Kondo (2010) who described it as *Cryptostigma melissophilum* Kondo. Kondo (2010) also described a second species, *C. chacoensis* Kondo, associated with stingless bees, which is found inside the nests of two stingless bees, *S. timida* and *Plebeia* sp. (D. Roubik, personal communication *apud* Kondo, 2010).

In the present report, *Plebeia droryana* (Friese, 1900) was collected in association with *Ceroplastes janeirensis* Gray, 1828 (Hemiptera: Coccoidea: Coccidae) (Figure 1), in December 2007, on *Myrcia cauliflora* Berg. (Myrtaceae) in an urban area of Araraquara, São Paulo, Brazil, located between the coordinates 21° 58' -22° 00' S and 47° 51' -47° 52' W.

Additional samples were collected between January and August 2009, in order to confirm this novel scale insect interaction. The scale insects and bees were stored separately in 75 and 100% ethanol respectively.

The coccoid was mounted on microscopic slides following the methodology described by Gullan (1984), and identified according to Peronti et al. (2008). The bee specimens were sent to a specialist for identification. All specimens are deposited at the Universidade Federal de São Carlos, SP, Brazil.

The specimens of *Ceroplastes janeirensis* collected had their wax test completely or almost completely removed by the bees (Figure 2). The absence of the wax test, which is responsible for protection of these coccids, causes dehydration of the coccids and facilitates the action of



Figure 1. *Plebeia droryana* removing the waxy test of *Ceroplastes janeirensis*.



Figure 2. *Ceroplastes janeirensis* with waxy test removed by the bees.

natural enemies, leaving them more vulnerable. In this case, the interaction appears to be negative for the scale insects.

The use of the coccid wax obtained by *P. droryana* remains unknown, but according to the literature, we suggest that it is probably used for the construction of their nests.

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