

## SCIENTIFIC NOTE

## Frugivory by a Stingless Bee (Hymenoptera: Apidae)

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**ABSTRACT** - Frugivory is not frequent among bees. Although stingless bees visit aged fruits for pulp, the use of fresh fruits is recorded only for *Trigona hypogea* Silvestri, a species that does not visit flowers. Here we report the occurrence of frugivory in *Trigona amazonensis* (Ducke), a flower-visiting stingless bee.

**KEY WORDS:** Eusocial bee, Amazon, Neotropical bee, trophic interaction

Although stingless bee of the genus *Trigona* are important pollinators (Heard 1999, Slaa *et al* 2006), they may in some cases damage non-domesticated and domesticated plants and be considered pests (Schwarz 1948, Boiça Jr *et al* 2004, Renner 2004). *Trigona* bees bite into the soft, growing plant tissue or perforate fruits for resin, which is mixed with mud and bees' wax to form what is named cerumen, a nest construction material (Nogueira-Neto 1997). Besides flowers, *Trigona* bees may visit a wide variety of sweet food sources to obtain carbohydrates (Schwarz 1948, Baumgartner & Roubik 1989). *Trigona hypogea* Silvestri, *T. necrophaga* Camargo & Roubik and *T. crassipes* (Fabricius) are obligate necrophages and use flesh as protein source in lieu of pollen (Roubik 1989, Noll 1997). *Trigona hypogea* stores in its nest a honey-like and tasteful substance composed of juices collected from extra-floral nectarines and from medium-ripe and ripe fruits (Noll *et al* 1997). The use of fruits of *Eugenia jambolana* by *T. hypogea* as reported by Noll *et al* (1997) represents a case of frugivory, an uncommon behavior among bees (review in Kevan *et al* 2005). In spite of this, rotting fruit pulp collection by different species of stingless bees is well-documented (Schwarz 1948, Baumgartner & Roubik 1989, Roubik 1989). Here we report that frugivory in stingless bees is not confined to *T. hypogea* group.

*Trigona amazonensis* Silvestri is a common Amazonian stingless bee that constructs nests externally attached to large trees or other vertical surfaces, as house walls or boulders (Schwarz 1948, Roubik 1989, Camargo & Pedro 2008). In Rio Branco region (Acre, Brazil), the cerumen of *T. amazonensis* may have small pieces of grass, which workers collect mainly on cattle feces (RCP pers. observ.).

Between 17 February and 06 March 2009, we observed large numbers of workers of *T. amazonensis* visiting non-cultivated guava trees (*Psidium guajava*, Myrtaceae) bearing fruits located at a pasture near Rio Branco city. Closer inspection revealed that bees were using their mandibles to dig fruit rind out in order to have access to the sweet, red pulp.

Attacked fruits possessed holes with around 1 cm in diameter from where bees came in and out. The activity around and within the fruits were intense, with up to 10 bees (mean  $2.9 \pm 2.22$  SD;  $n = 26$ ) being counted at one time in a single fruit. Bees landed and took off directly from the fruit surface. They visited both medium-ripe and ripe fruits and spent from 08 to 280 s (mean  $124.0 \pm 73.34$  SD;  $n = 27$ ) on them.

We observed bee activity on fruits daily from 02 to 06 March in different hours, from morning to evening. The bees actively visited the fruits at all daylight hours from 08:00h to 17:00h. Workers visited at least 50 fruits on a large plant (ca. 3m tall and canopy with 6m round). The juice of sampled guava fruits was diluted (mean sugar concentration:  $11.6\% \pm 0.70$  SD,  $n = 23$ ) and the juice of attacked and non-attacked fruits had equally low sugar content (attacked fruits:  $11.5\% \pm 1.46$  SD,  $n = 11$ ; non-attacked fruits:  $11.7\% \pm 1.60$  SD,  $n = 12$ ; Mann-Whitney U test,  $Z = -0.22$ ,  $P = 0.83$ ). We observed five workers on guava fruits concentrating guava juice by evaporation. These workers held under the tongue a relatively large drop of juice and repeatedly sucked it in and out. Such behavior is common among different bee species and serves to eliminate excess of water and compensate for less than ideal nectar concentration (Michener 1974, Nicolson 2009).

*Trigona amazonensis* workers were aggressive toward other frugivorous insects at the fruits. With their mandibles open they chased wasps (different species of *Polybia* and *Polistes*) (Hymenoptera: Polistinae) and butterflies (Lepidoptera: Nymphalidae) out of the fruits. We did not observe workers of other stingless bee species visiting nor eating guava fruits during the observation period. No *T. amazonensis* worker was seen carrying seeds nor did any have corbicular loads. There were many rotten fruits at guava trees and on the ground, but we did not see any *T. amazonensis* worker visiting them. We believe this short scientific report may be useful for those with general interest in the natural history of stingless bees or ecology of tropical plants.

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