

## Interactions between ants (Hymenoptera: Formicidae) and *Xylocopa caffra* (A LINNÉ, 1767) (Hymenoptera: Apidae) in the Republic of Seychelles

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### Abstract

Interactions between *Camponotus grandidieri* FOREL, 1886 nesting in the same wooden habitat, *Tapinoma melanocephalum* (FABRICIUS, 1793) and *Pheidole megacephala* (FABRICIUS, 1793), both are predators, and the carpenter bee *Xylocopa caffra* (A LINNÉ, 1767) have been investigated. Only *Pheidole megacephala* is a dangerous enemy for the nests of *Xylocopa caffra*.

Key words: *Camponotus grandidieri*, *Pheidole megacephala*, *Tapinoma melanocephalum*, defence behaviour.

### Zusammenfassung

Wechselbeziehungen zwischen den Ameisenarten *Camponotus grandidieri* FOREL, 1886, der sein Nest auch im Holz anlegt, *Tapinoma melanocephalum* (FABRICIUS, 1793) und *Pheidole megacephala* (FABRICIUS, 1793), die letzteren sind Räuber, und *Xylocopa caffra* (A LINNÉ, 1767) wurden untersucht. Nur *Pheidole megacephala* kann den Nestern von *Xylocopa caffra* gefährlich werden.

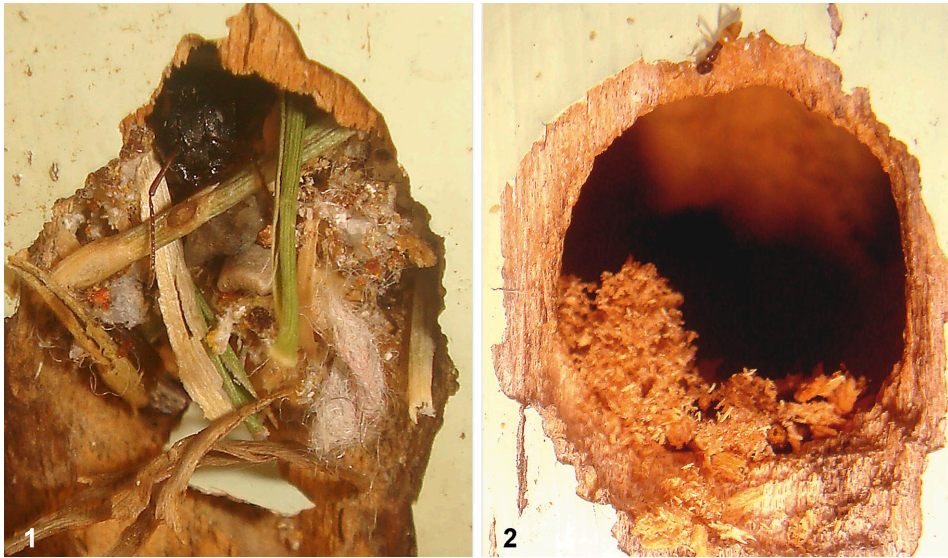
### Introduction

Interactions between ants and carpenter bees of the genus *Xylocopa* LATREILLE, 1802 have been observed by several authors (e.g., ANZENBERGER 1977, GERLING et al. 1983, WATMOUGH 1974). During their invertebrate survey on the island of Bird (Republic of Seychelles) HILL et al. (2002: 19) came to the conclusion, that the tramp species *Anoplolepis gracilipes* (SMITH, 1857) (subfamily Formicinae) reduces the nesting area of *Xylocopa caffra* (A LINNÉ, 1767): “Although solitary carpenter bees *Xylocopa* sp. appeared abundant, nests were concentrated in an area of *Scaevola* in the southeast of the island yet to be colonised by ants”.

This study was carried out during two visits (March 15–29, and October 26 – November 7, 2011) at La Roussette Hotel in Anse aux Pins on Mahé, the main island of the Republic of Seychelles.

### Observations

In the study area at the bungalows numbers 1 and 2 several ant species live in the vicinity of *Xylocopa caffra* nests, but only the following three ant species had interactions with



Figs. 1–2: (1) *Camponotus grandidieri* adapting an abandoned *Xylocopa caffra* nest as a colony site. (2) *Tapinoma melanocephalum* above a nest of *Xylocopa caffra*.

*Xylocopa caffra*. The tramp species *Tapinoma melanocephalum* (FABRICIUS, 1793) (subfamily Dolichoderinae) and *Pheidole megacephala* (FABRICIUS, 1793) (subfamily Myrmicinae) are predators searching for pollen, nectar or remains of dead larvae or pupae in the nests of *Xylocopa caffra*, whereas *Camponotus grandidieri* FOREL, 1886 (subfamily Formicinae) nests in the same habitat as *Xylocopa caffra*.

#### ***Camponotus grandidieri* FOREL, 1886 (Fig. 1)**

In March *Camponotus grandidieri* tried to establish colonies in abandoned nests of *Xylocopa caffra* or leafcutter bees in the columns II and IV (Fig. 1) at bungalow number 2. During that time the workers were foraging in the study area, but never tried to enter nests of *Xylocopa caffra*.

At the end of October all nests of *Camponotus grandidieri* were abandoned. The reason why is unknown to me. Maybe the nests came in direct contact with *Xylocopa* nests and *Camponotus grandidieri* was driven out by *Xylocopa* females or due to the aggressive behaviour of *Pheidole megacephala* in the study area (see also below).

#### ***Tapinoma melanocephalum* (FABRICIUS, 1793) (Fig. 2)**

*Tapinoma melanocephalum* is often overlooked in the field due to the size (less than 2 mm) and the bicoloured markings (head and thorax are black, antennae, legs and abdomen are pale or translucent).

On a photo I have seen a single worker in the entrance hole of the *Xylocopa caffra* nest during the emergence of the parasitoid *Coelopencyrtus* sp. (Encyrtidae) (see GUERRIERI et al. 2013). This worker was driven out by activities of the *Xylocopa* female a little later (Fig. 2).



Fig. 3: (a) Several workers of *Pheidole megacephala* entering the nest of *Xylocopa caffra*. (b) A *Xylocopa* male defending the nest entrance with the antennae. (c) A *Xylocopa* female blocking the entrance hole with the dorsal surface of the abdomen. (d) A *Xylocopa* female defending the nest with proboscis and antennae. (e) A *Xylocopa* female (left) and male (right) guarding the nest entrance after the raid.

Although I have often observed a single worker near the entrance holes of *Xylocopa* nests, I could not find a nest of *Tapinoma melanocephala* in the study area. The presence of single foraging workers seems to have no negative effects to *Xylocopa caffra*.

### *Pheidole megacephala* (FABRICIUS, 1793) (Fig. 3)

*Pheidole megacephala*, which is the dominant ant species in the study area, is a soil-nesting ant. I found a single nest under column II (bungalow number 2), above it two nest entrances (nests II and III) of *Xylocopa caffra*. Nest II is about 9 cm above ground level and nest III about 25 cm.

Two or three ant workers (sometimes only a single worker) often tried to penetrate the nests II and III of *Xylocopa caffra*, but were usually driven out by guarding females.

On March 18, 2011 I observed a raid of *Pheidole megacephala*. At 07:52 a.m. several workers entered nest III, which had at least two tunnels (Fig. 3a). At 07:54 a *Xylocopa* female returned to the nest ignoring the entering ants. At 07:59 I observed the first defence activities of a *Xylocopa* male in the entrance hole blocking the ascending tunnel with the head and fending off entering ants with the antennae (Fig. 3b). About five minutes later a female, which had defended the descending tunnel, took over the defence of the entrance hole, while the descending tunnel was blocked by the male. The inside was defended alternately by movements up and down (dorsal surface blocking the descending tunnel and body bent upwards or dorsal surface blocking the ascending tunnel and body bent downwards), by blocking the entrance hole with the abdomen (Fig. 3c), or by attacking entering ants with antennae and proboscis (Fig. 3d) at the entrance rim. About 15 minutes later the raid was successfully beaten back by the female. Although the nest was guarded by a female and male for further 15 minutes, workers of *Pheidole megacephala* tried to penetrate the nest, but without success (Fig. 3e). During the night the entrance hole is blocked against intruders by a female with the dorsal surface of the abdomen.

In his study on South African *Xylocopa* species WATMOUGH (1974: 269) states, that *Pheidole megacephala* can almost wipe out *Xylocopa* species in small areas, but certain species (e.g., *Xylocopa caffra*) can defend themselves effectively for several days. As *Xylocopa caffra* is a multivoltine species, *Pheidole megacephala* can be dangerous only during nest founding, as long as only one female is breeding and foraging. In this study *Xylocopa caffra* resisted the attacks of *Pheidole megacephala* for more than seven months.

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