



SHORT NOTE

Camponotus renggeri (Formicidae) predated *Agelaia vicina* (Vespidae) nest and occupied *Parachartergus pseudapicalis* (Vespidae) nest

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Abstract

Ants prey on social wasps affecting the evolution of nest architecture, defense behaviors, and selection of nesting sites of these insects. The importance of social wasps in natural and agricultural ecosystems, especially in biological control, justifies studies on predation of these insects by ants. The objective of this work is to report the colony predation of the social wasp *Agelaia vicina* (de Saussure, 1854) and the nest occupation of *Parachartergus pseudapicalis* Willinck, 1959 (Hymenoptera: Vespidae) by the ant *Camponotus renggeri* Emery, 1894 (Hymenoptera: Formicidae) in the Atlantic Forest biome. The records occurred in 2015 and 2018 in southern Minas Gerais state, Brazil. This is the first record of *C. renggeri* preying on and occupying social wasp nests. This relationship between social wasps and ants constitutes an adaptation for the survival of these latter insects, and the limited number of records increases the need for research on the relevance of this phenomenon to the ecology of Atlantic Forest Hymenoptera.

Ants prey on social wasps (Maciel et al., 2016) affecting the evolution of nest architecture (Andena et al., 2009), defense behaviors (Milani et al., 2021), and selection of nesting sites of these insects (Corbara et al., 2009). In addition, they attack and loot larvae and pupae in wasp colonies (O'Donnell & Jeanne, 1990; Bouwma et al., 2007), as reported for *Eciton burchelli* (Westwood, 1842) (Hymenoptera: Formicidae) preying on larvae and pupae of *Agelaia yepocapa* (Richards, 1978) (Hymenoptera: Vespidae), even in colonies with thousands of individuals of this wasp (Hunt et al., 2001).

The importance of social wasps in natural and agricultural ecosystems (Souza & Zanuncio, 2012), especially in the biological control (Prezoto et al., 2019), justifies studies on predation of these insects by ants. The objective of this

work is to report the colony predation of the social wasp *Agelaia vicina* (de Saussure, 1854) and the nest occupation of *Parachartergus pseudapicalis* Willinck, 1959 (Hymenoptera: Vespidae) by the ant *Camponotus renggeri* Emery, 1894 (Hymenoptera: Formicidae) in the Atlantic Forest biome.

Camponotus renggeri preyed on an *A. vicina* nest and occupied a *P. pseudapicalis* nest in 2015 and 2018, respectively, in the Atlantic Forest in the municipality of Inconfidentes (22.3174° S, 46.3255° W), Minas Gerais state, Brazil. Information about the environment, year season, the substrate used for nesting, and height of the social wasps' nests from the ground were recorded. Specimens of social wasps and ants were collected and identified by dichotomous keys (Richards, 1978; Carpenter & Marques, 2001) or by



the taxonomists Dr. Orlando Tobias da Silveira (Emílio Goeldi Museum, Belém, Pará) and Dr. Rodrigo M. Feitosa (Laboratory of Systematics and Biology of Ants, Federal University of Paraná). The collected material was deposited in the biological collection of IFSULDEMINAS, Campus Inconfidentes, tumble number 04798-2018, 04786-2018, 06531-2018 and 06532-2018. The plants used by wasps for nesting were identified in the field or based on photographs by Professor Laércio Loures from IFSULDEMINAS - Campus Inconfidentes.

Camponotus renggeri preyed on individuals of *A. vicina* in a nest built in the tree species *Erythrina falcata* (Fabaceae) at about 1.5 m above the ground in late autumn,

the dry season in the research region. Individuals of this ant tried to enter through the hollow of the tree, accessing the combs fixed inside the trunk in the colony of *A. vicina*, and the wasps, agitated, tried to defend the colony, apparently by biting the ants, as reported with *Polybia occidentalis* Olivier, 1791 on *Camponotus atriceps* Smith, 1858 (Bowman et al., 2007) and *A. yepocapa* on *E. burchelli* (O'Donnell & Jeanne, 1990). In addition to this defensive behavior, wasps can also detect and eliminate pheromone foci left by ants, reducing access signaling to their colonies (Bouwma et al., 2007). On the other hand, wasps can prey on ants, as demonstrated by the analysis of food stored in colonies of *P. occidentalis* and *Polybia paulista* Ihering 1896 (Michelutti et al., 2014).

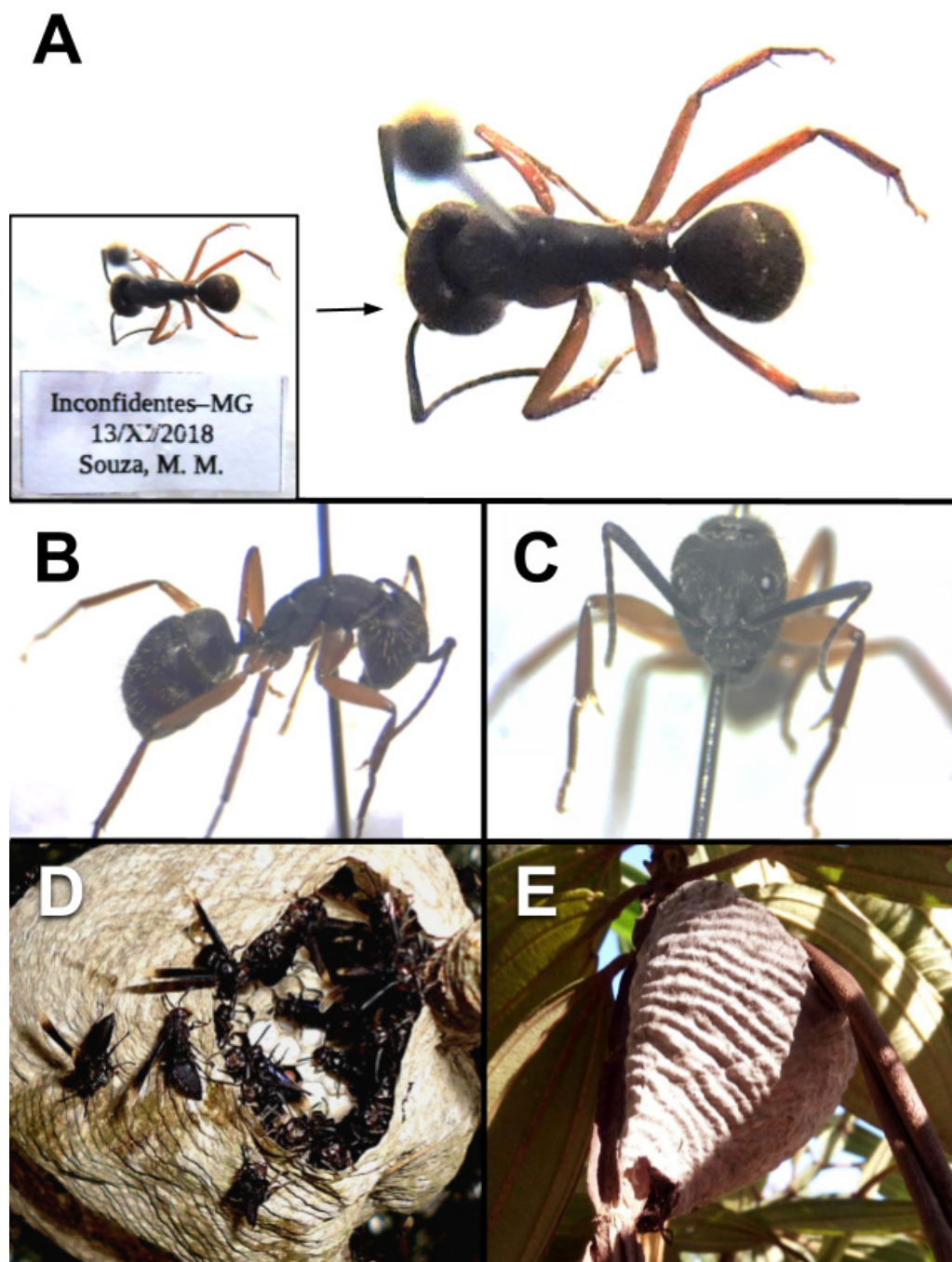


Fig 1. *Camponotus renggeri* (Formicidae) (A, B and C) occupied a nest *Parachartergus pseudapicalis* (Vespidae) (D and E).

Camponotus renggeri (Figure 1A, 1B and 1C) occupied a nest of *P. pseudapicalis* (Figure 1D) nesting in *Tibouchina granulosa* (Desr.) Cogn. (Melastomataceae), 1.9 m above ground in late spring, rainy season, apparently abandoned by this wasp. This occurred one week after the registration of the social wasp colony. No information on whether the ants looted and preyed on the wasps or simply occupied the abandoned nest (Figure 1E) and the lack of wasps prevented the ethological record between *C. renggeri* and *P. pseudapicalis*. These records are important, as ants can be opportunistic, preying on offspring without necessarily confronting adult wasps (Lacey, 1979).

The importance of nest height for social wasps is poorly studied (de Souza et al., 2012; Almeida et al., 2014), but the proportion between nest height and aggressiveness as defense strategies of these insects seems to be inversely correlated (Jeanne, 1975). The height of *Agelaia* spp. nests varies because these wasps use natural and artificial cavities, such as tree hollows to nest, commonly without a protective envelope (Zucchi et al., 1995).

The seasonality of occurrences and the opportunistic nesting and foraging behavior (Silvestre et al., 2003; Yamamoto & Del-Claro, 2008; Lange et al., 2019) of ants of the genus *Camponotus* suggests that the attack in late autumn on the *A. vicina* nest is associated to the reduction of resources in the environment due to drought. On the other hand, the occupation of the *P. pseudapicalis* nest at the beginning of the rainy season may be associated with the search for refuge and, eventually, for resources.

Camponotus renggeri, widely distributed in South America, feeds mainly on liquid resources of extrafloral nectaries and trophobionts and builds its nests underground and on dead branches and trunks or plant roots (Ronque et al., 2018). *Camponotus atriceps* Smith, 1858, *Camponotus rectangularis* Emery, 1890, and other species of this genus preyed on and occupied nests of the social wasp *Polybia occidentalis* (Bouwma et al., 2007).

This is the first record of *C. renggeri* preying on and occupying social wasp nests. This relationship between social wasps and ants constitutes an adaptation for the survival of these latter insects, and the limited number of records increases the need for research on the relevance of this phenomenon to the ecology of Atlantic Forest Hymenoptera.

Author's Contribution

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G CJ: Resources; Writing-Review & Editing; Visualization

GSTG: Investigation; Writing-Original Draft

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