

Scientific Note

First report of *Crematogaster acuta* (Fabricius, 1804) (Hymenoptera: Formicidae) in association with palm-aphid on solitary açai palm seedlings (*Euterpe precatoria* Martius) in Acre, Brazil

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Edited by: Jorge L. P. Souza¹

Received: December 12, 2025. Accepted: January 26, 2026. Published: March 11, 2026.

Abstract. Ant-hemipteran mutualisms are widespread in tropical ecosystems yet remain undocumented in many Amazonian plant species. Here, we report the first record of a trophobiotic association between the acrobat ant *Crematogaster acuta* (Fabricius, 1804) and the palm-aphid *Cerataphis brasiliensis* (Hempel, 1901) on seedlings of *Euterpe precatoria* Martius, 1842 (Arecaceae) in the state of Acre, Brazil. Ants were observed tending aphid colonies, collecting honeydew, and exhibiting protective behaviors against potential predators. This novel record adds to the growing knowledge of ant-aphid interactions in Amazonian palms and suggests potential ecological implications for aphid persistence and solitary açai palm seedling health.

Keywords: Amazon; Aphididae, Trophobiosis, Ant-aphid interaction.

Insect-plant interactions mediate essential ecological processes, including herbivory, pollination, and mutualistic associations (Calatayud et al. 2018). Among these, ant-hemipteran interactions are among the best studied, in which ants obtain carbohydrate-rich honeydew while providing protection to their partners (Delabie 2001; Stadler & Dixon 2005; Billick et al. 2007). Such trophobiotic relationships can happen from mutualistic ant-tending to exploitative predation by ants (Offenberg 2000). These interactions influence aphid population dynamics, predator-prey interactions, and plant health (Offenberg 2000; Styrsky & Eubanks 2007). In tropical ecosystems such as the Amazon, where ants are abundant and diverse (Feitosa et al. 2022; Schmidt et al. 2022), these and other associations (e.g., Fontenele & Schmidt 2021; Miranda et al. 2022; Santos et al. 2022) play a particularly important role in structuring plant-insect interactions and may directly influence seedling survival and forest regeneration.

Although associations between the palm-aphid *Cerataphis brasiliensis* (Hempel, 1901) (Hemiptera: Aphididae) and ants have been documented (Campos-Farinha & Zorzenon 2005; Lunz et al. 2010; 2011), ecological information remains scarce for Amazonian palms. *Cerataphis brasiliensis* is widely associated with palms in tropical regions and is recognized as an important pest, particularly due to its ability to form dense populations on seedlings and juvenile plants (Lunz et al. 2010; 2011; Santos et al. 2023). Among the ants reported in association with *C. brasiliensis* are species of the genus *Crematogaster* Lund, 1831 (Hymenoptera: Formicidae) (Ahmad et al. 2020; Giannetti et al. 2021). The genus *Crematogaster* is diverse and widely distributed across Neotropics (Blaimer 2012), with several species known to establish trophobiotic interactions with honeydew-producing hemipteran insect (Pringle 2020; Nelson & Mooney 2022). However, specific records for *Crematogaster acuta* (Fabricius, 1804) (Hymenoptera: Formicidae) remain rare, particularly in Amazonian ecosystems.

Here, we document for the first time the trophobiotic association between *C. acuta* and *C. brasiliensis* on seedlings of *Euterpe precatoria*

Martius (Arecaceae) in the state of Acre, Brazil. *Euterpe precatoria* (solitary açai palm) is a key Amazonian palm in Acre, with both ecological and economic significance. Ecologically, it provides food and habitat for a variety of frugivorous birds, mammals, and insects, contributing to seed dispersal and forest regeneration (Henderson 1995). Economically, its fruits support local communities through subsistence and small-scale commercial activities, including juice and pulp production (Rocha 2004; Oliveira et al. 2022). Understanding the interactions between *E. precatoria* and local fauna is therefore essential. In this context, documenting the trophobiotic association between *C. acuta* and the *C. brasiliensis* on seedlings of *E. precatoria* provides novel insight into how ant attendance may influence aphid populations and potentially affect the growth and health of this economically important palm.

Field observations were carried out in May 2024 in the municipality of Rio Branco, Acre, Brazil (10°01'33.5"S; 67°42'23.3"W) (Fig. 1). Seedlings of *E. precatoria* were examined for the presence of *C. brasiliensis* populations and associated ants. Ant specimens were collected directly from seedlings using a fine paintbrush and preserved in 70% ethanol. Identification was conducted to genus level using morphological keys (Baccaro et al. 2015) and confirmed by comparison with specimens deposited in the Laboratory of Ant Ecology, Federal University of Acre, municipality of Rio Branco, state of Acre, Brazil. Voucher specimens were deposited under accession numbers 3844, 3845 and 3846.

Populations of *C. brasiliensis* were observed on the leaves and stems of *E. precatoria* seedlings. Workers of *C. acuta* were consistently associated with aphid aggregations, actively collecting honeydew and displaying protective behaviors by deterring potential predators approaching the colonies. Aphid populations remained stable during repeated observations, which suggests that ant attendance may contribute to population persistence. Similar associations have also been documented recently, such as *Crematogaster subnuda* Mayr, 1879 attending *Melanaphis sacchari* (Zehntner, 1897) and reducing

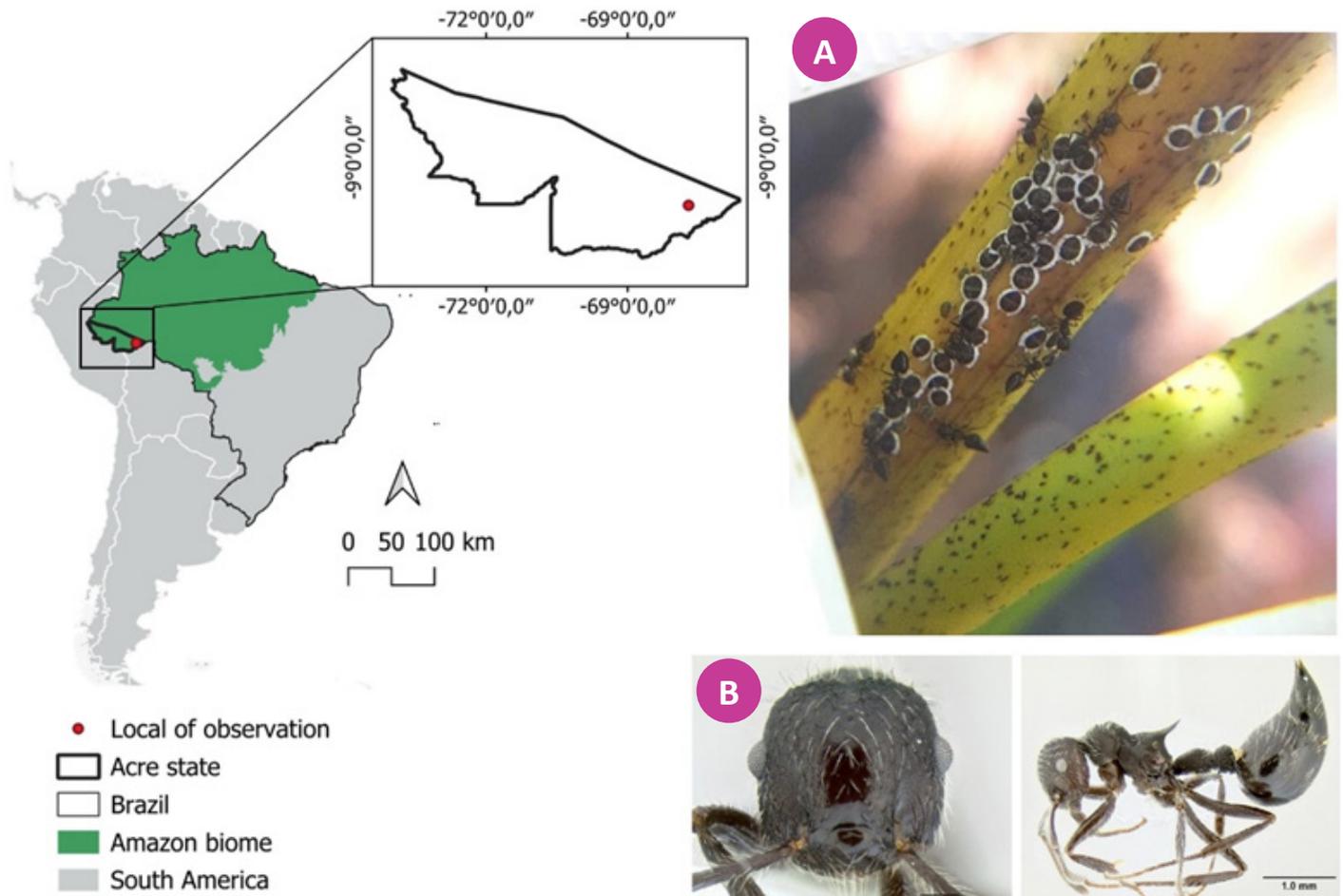


Figure 1. Localization of the first report of *Crematogaster acuta* (Hymenoptera: Formicidae) and *Cerataphis brasiliensis* (Hemiptera: Aphididae) association. (A) Field record of ant-aphid interaction in the *Euterpe precatoria* palm, image by Paula Rita de Cássia Silva de Souza; (B) *Crematogaster acuta*, image by Michael Branstetter, available at <https://www.antweb.org> (CASENT0106245).

parasitoid effectiveness (Ahmad et al. 2020), and *Crematogaster erecta* Mayr, 1866 and *Crematogaster victima* Smith, 1858 frequently tending hemipterans in cacao agroecosystems, influencing predator-aphid dynamics (Silva & Perfecto 2013), which demonstrate that interactions between *Crematogaster* ants and aphids is frequently found in nature.

This is the first documented case of *C. acuta* tending *C. brasiliensis* in Acre, Brazil, and the first record of this interaction on *E. precatoria* seedlings. Previous studies have shown that *Crematogaster* species often engage in trophobiotic associations with hemipterans (Reis Filho et al. 2002; Pringle 2020; Nelson & Mooney 2022), but species-specific interactions remain poorly understood in Amazonian ecosystems, especially on *E. precatoria* plants.

The presence of *C. acuta* attending aphid colonies may have ecological consequences. By protecting *C. brasiliensis* from predators, ants could indirectly increase aphid survival, potentially intensifying seedling stress. Such interactions may influence plant growth, survival, and susceptibility to other herbivores (Lunz et al. 2011; Wells 2012). Furthermore, ant species that associate with sap-sucking insects cause indirect damage, since, in addition to protecting them from natural enemies, they spread a sugary substance excreted by these insects (honeydew), which promotes the development of sooty mold fungi that impair plant growth (Bueno & Campos-Farinha 1999; Santos et al. 2023).

From an applied perspective, these associations may also be relevant for agroforestry systems involving *E. precatoria*, since this palm is increasingly incorporated into diversified production systems in the Amazon (Rocha 2004; Oliveira et al. 2022). As infestations of *C. brasiliensis* can compromise seedling growth and survival (Lunz et al. 2011; Wells 2012; Santos et al. 2023), the attendance of aphids by *C. acuta* may exacerbate this impact by enhancing aphid persistence through protection from natural enemies. By other way, the presence

of *Crematogaster* ants can also benefit the plant scaring away potential herbivores (Souza et al. 2023). Understanding this interaction is therefore important for developing management strategies that ensure the successful establishment of *E. precatoria* in agroforestry practices.

Future studies should investigate the frequency and ecological consequences of this interaction across different habitats and stages of plant development, as well as its potential role in agroforestry or conservation contexts. Furthermore, ecological questions may be raised in future studies regarding the specific plant structure preferences these interactions occur in and what ecological mechanisms and factors drive these preferences.

Acknowledgments

We thank the Laboratório de Ecologia de Formigas at the Universidade Federal do Acre for logistical and technical support, and to the undergraduate research fellow, Paula Rita de Cássia Silva de Souza, for her fieldwork.

Funding Information

KB, LKF and KMS – Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) provided scholarships support. RMF – CNPq Productivity Grant (304012/2023-8). FAS – productivity research grant supported by Universidade Federal do Acre (internal productivity grant #22/2025).

Conflict of Interest Statement

The authors declare that they have no competing interests.

Authors' Contributions

KB: Data Curation, Writing - Original Draft. RSS: Conceptualization, Investigation, Writing - Review & Editing. LKF: Data Curation, Writing - Review & Editing. KMS: Data Curation, Writing - Review & Editing. RMF: Validation, Writing - Review & Editing. FAS: Conceptualization, Supervision, Writing - Review & Editing.

Ethical Approval

Not applicable.

Data Availability

Not applicable.

Generative AI Statement

No AI information was used in this study.

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