



SHORT NOTE

Significant Biogeographic Range Expansion of the Social parasite *Acromyrmex fowleri* Rabeling et al., 2019

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Abstract

Five species of social parasites within the leaf-cutting ant genera *Acromyrmex* and *Pseudoatta* have been documented. Among these, *Acromyrmex fowleri*, an inquiline social parasite of *A. rugosus*, was previously recorded exclusively from the coastal zone of Ilhéus, Bahia, Brazil, where specimens were collected between 1992 and 1996. Despite extensive sampling efforts in the region, no new records have emerged. This study presents a significant expansion in the distribution of *A. fowleri*, based on a single dealate female collected in 2005 in Miranda, Mato Grosso do Sul, which is located within the Pantanal biome. This record extends the species' biogeographic range by approximately 1900 km westward and 600 km southward from Ilhéus. Interestingly, the ecological conditions in the Pantanal biome contrast sharply with those of the parasite's previously known restinga habitat. The association of collection events with nearby bodies of water suggests that *A. fowleri* may be attracted to humid microhabitats, which could elucidate the challenges in detecting its rarely sampled sexual forms. Our findings indicate that *A. fowleri* possesses a broader distribution than previously acknowledged, suggesting that additional specimens may be present in entomological collections throughout the host's extensive biogeographic range.

The leaf-cutting ants are part of a monophyletic group of fungus-growing ants (Myrmicinae, Attini, Attina), which evolved an obligate symbiosis with basidiomycete fungi approximately 66 million years ago (Schultz et al., 2024; Ward et al., 2015). Within this subtribe, the leaf-cutting ant genus *Acromyrmex* comprises a speciose group with 32 species and 18 subspecies (Bolton, 2025; Mera-Rodriguez et al., 2025).

While all extant ant species share a common eusocial ancestor, socially parasitic ant species exploit the social behavior of their hosts for their own survival and to raise their sexual offspring (Buschinger, 2009; Rabeling, 2021). Within

the fungus-growing ants, six species of social parasites are known. In addition to *Acromyrmex fowleri* Rabeling, Messer, Lacau & Delabie, 2019, which parasitizes *Acromyrmex rugosus* (Smith, 1858) along the southern coast of Bahia, the following species were described: *Acromyrmex ameliae* De Souza, Soares & Della Lucia, 2007, which has two host species of *Acromyrmex*: *Acromyrmex atrina* Fisher, 2025, and *Acromyrmex subterraneus* (Forel, 1893) in the state of Minas Gerais, Brazil; *Acromyrmex insinuator* Schultz, Bekkevold & Boomsma, 1998, in Panama, whose host is *Acromyrmex octospinosus* (Reich, 1793); and *Acromyrmex charruanus* Rabeling, Schultz, Bacci & Bollazzi, 2015, which exploits

Acromyrmex heyeri (Forel, 1899) as its host in Uruguay. The genus *Pseudoatta* Gallardo, 1916, includes one species and one subspecies of social parasites (*Pseudoatta argentina* and *Pseudoatta argentina platensis*) that parasitize multiple *Acromyrmex* species, occurring from southern Brazil to northern Argentina (Gallardo, 1916, 1929; Delabie et al., 2011; Marsaro Júnior et al., 2025). This genus is noteworthy because it morphologically converges with *A. fowleri*, making its potential synonymization under the genus *Acromyrmex* likely once a comprehensive revision of this group of ants is concluded. The only other known social parasite species of fungus-growing ants, which is not part of the leaf-cutting ants, is the inquiline *Mycocepurus castrator* Rabeling & Bacci 2010, which uses *Mycocepurus goeldii* (Forel, 1893) as its host (Rabeling & Bacci, 2010).

Winged sexuals of *A. fowleri* were irregularly collected at three sites along approximately 40 km of coastline in the

municipality of Ilhéus, Bahia, from 1992 to 1996 (Rabeling et al., 2019). Despite significant efforts to collect ants in this region, which is part of the Brazilian Atlantic Forest biome, no new collections of this species have been reported. *Acromyrmex fowleri* is an inquiline social parasite of *A. rugosus*. Its host is widely distributed in South America (Argentina, Bolivia, Brazil, Paraguay, and Peru) and has occurrence records for nearly all Brazilian states (Delabie et al., 2011; Antwiki, 2025). Although both species utilize the beaches of Ilhéus for their nuptial flights, no synchronization in their reproductive behavior has been observed.

An additional dealate female of *A. fowleri* (Figure 1) was collected alive on the morning of November 13, 2005, by JHCD and CSFM in the pool of the Hotel Fazenda Meia Lua (20°15'56.4"S 56°18'12.8"W) in the municipality of Miranda, state of Mato Grosso do Sul, Brazil (Figure 2). Species identification was carried out by comparing it with the

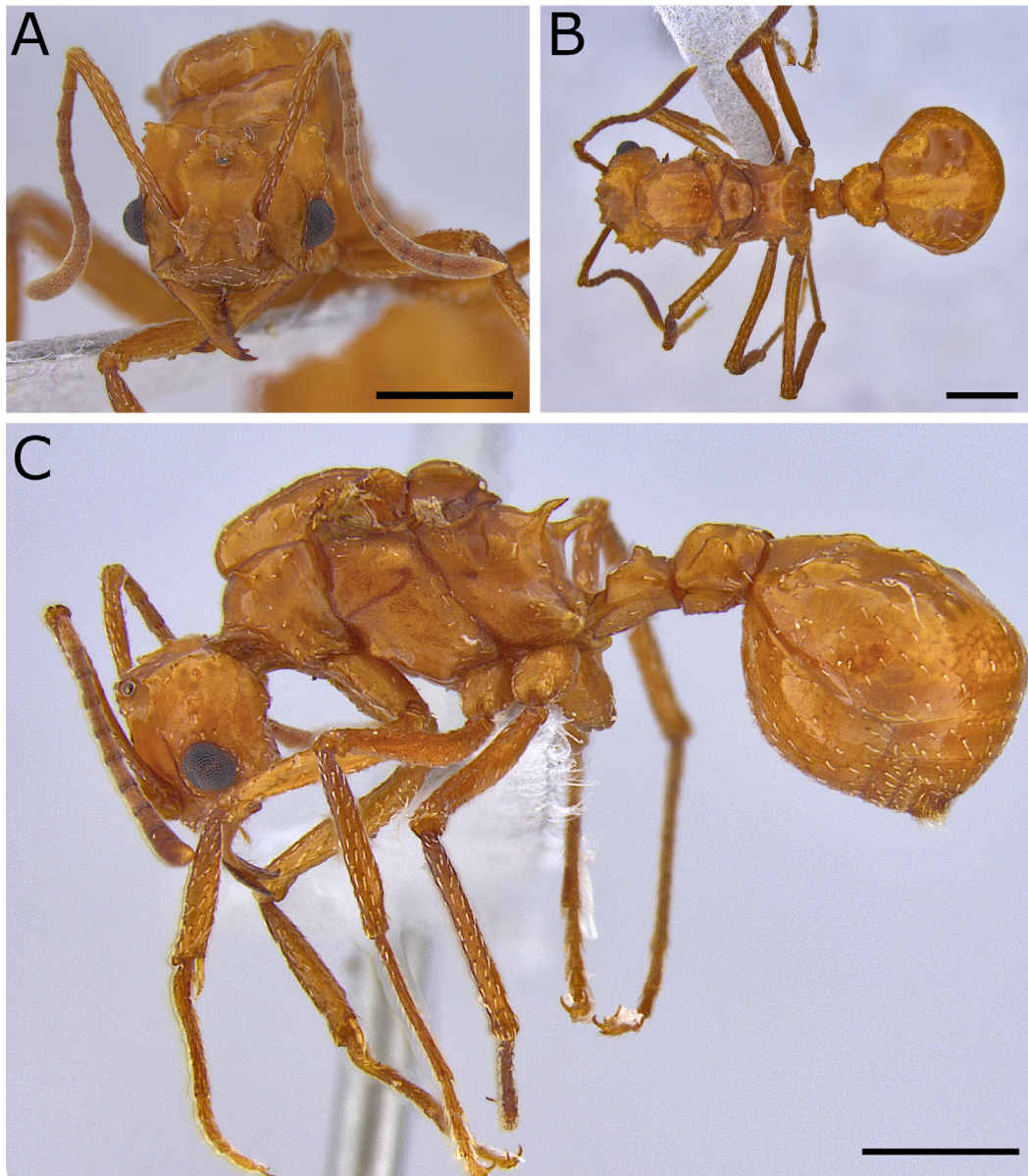


Fig 1. Gyne of the social parasite *Acromyrmex fowleri* (CPDC-0002319) collected in Miranda, MS, Brazil, in full-face (a), dorsal (b), and lateral (c) views. All scale bars represent 1mm.

photograph of the holotype and several paratype specimens from the series used in the original description (Rabeling et al., 2019).

The record presented here represents a significant expansion of the known biogeographic distribution of the species because it is located 1900 km to the west and 600 km to the south of the type locality in Ilhéus, Bahia (Figure 2). Additionally, it is noteworthy that the environment where *A. fowleri* was initially found consists of restinga areas associated with the Atlantic Forest, whereas the specimen from Miranda was discovered in the heart of the Pantanal, where cerrado vegetation predominates.

All individuals mentioned in the original description were collected in areas of high humidity in Ilhéus, along the beach, whereas the specimen from Miranda was found in a pool. This information suggests that bodies of water exert a particular attraction on this ant. Insects, in general, are sensitive to moisture gradients when moving (Enjin, 2017), and, in accordance with Espadaler & Lopez-Soria (1991), this phenomenon allows for the collection of rarely sampled sexuals of Formicidae by other means (Delabie et al., 2021).

Although it remains unconfirmed whether *A. fowleri* also parasitizes *A. rugosus* in Mato Grosso do Sul, we feel inclined toward this hypothesis since *A. rugosus* is a common

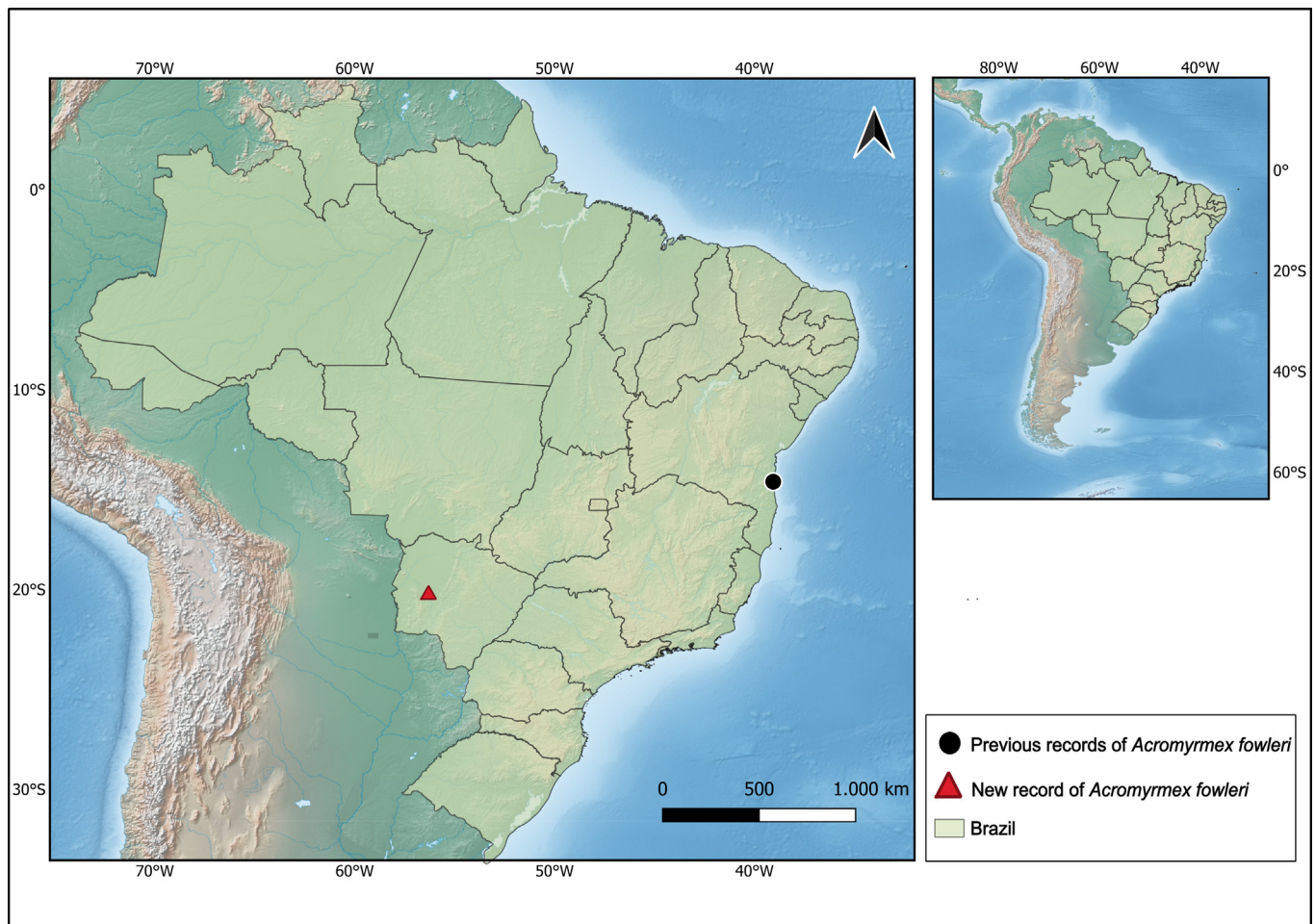


Fig 2. Known distribution of *Acromyrmex fowleri*. The black circle indicates the type locality of *A. fowleri* in Ilhéus, Bahia, Brazil. The red triangle shows the new collection locality of *A. fowleri* in Miranda, Mato Grosso do Sul, Brazil.

and widely distributed species that exhibits large population fluctuations, and it is plausible that peaks of high population density of this ant are susceptible to creating a favorable environment for parasitism. If so, the host-parasite relationship suggests a complex population dynamic influenced by various ecological and behavioral factors that could be investigated in further studies. The occurrence of *A. fowleri* in the Pantanal indicates that the social parasite species has a broader

distribution than previously thought, and its discovery in Mato Grosso do Sul falls within the distribution range of its presumed host, *A. rugosus*. However, we cannot exclude the possibility that another *Acromyrmex* species may be the host of this interesting social parasite in the Pantanal. It can be expected that a few other specimens will be found dispersed in the various entomological collections that cover the extensive distribution area of its host, *A. rugosus*.

Authors' Contributions

E.A.S.N.: Conceptualization, data curation, validation, writing-original draft, writing-review.

J.H.C.D.: Data collection, writing-original draft, writing-review & editing.

C.S.F.M.: Data collection, writing-review & editing.

C.R.: validation, writing-review & editing.

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