

Scientific Note

First report of Polyxenidae (Diplopoda: Polyxenida) as a host for *Charletonia rocciai* Treat & Flechtmann, 1979 (Trombidiformes: Erythraeidae) in Brazil

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Abstract. Reports of mites parasitizing arthropods are common worldwide. However, there hasn't been a single record of mite parasitism by any Erythraeidae species on the millipede Polyxenidae in Brazil. To address this gap, we present a record of the species *Charletonia rocciai* Treat & Flechtmann, 1979 (Trombidiformes: Erythraeidae), parasitizing a specimen of this millipede family in the country.

Keywords: velvet mite, Penicillata, ectoparasite, Southeast Brazil, Neotropical.

Members of the class Diplopoda (millipedes) commonly host various smaller invertebrates, such as nematodes, insects, and mites (David 2015). While millipedes are recognized for their defense mechanism involving repugnant liquids, for instance benzoquinones, phenols, and alkaloids (Shear 2015), it is not uncommon to observe a specimen freely moving with mites on its body rings. In Brazil, reports of mite parasitism on millipedes date back to the mid-1900s, specifically within the orders Spirobolida and Spirostreptida (Schubart 1947). More recently, a new report has emerged in the country regarding the genus *Leptus* Latreille, 1796 (Trombidiformes: Erythraeidae), parasitizing a species of Chelodesmidae (order Polydesmida) (Bassini-Silva et al. 2020). However, despite the extensive documentation of studies on the parasitism between these two arthropod groups, the nature of this relationship still needs to be better understood (Farfan & Klompen 2012). It is unclear whether the mites experience a positive effect or if the millipede's fitness is negatively impacted.

The mite species *Charletonia rocciai* Treat & Flechtmann, 1979 (Trombidiformes: Erythraeidae) has a wide distribution in southern and southeastern Brazilian regions. Since its description, this species has been reported to parasitize various arthropods such as flies, grasshoppers, froghoppers, dragonflies, booklice, spiders, and thrips (Bassini-Silva et al. 2022). Currently, there are no recorded instances of *C. rocciai* parasitizing any group of millipedes. In the present study, we report a case of *C. rocciai* parasitizing a millipede of the family Polyxenidae, marking the first record of a polyxenid species serving as a host for this mite in Brazil.

The species identifications were made at the Butantan Institute (IBSP) based on the literature and direct comparison with other specimens deposited in the zoological collection of the IBSP. The species *C. rocciai* was identified following its arrangement of setae, including those on the prodorsal sclerite (Fig. 1D), as outlined in Bassini-Silva et al. (2022) (Fig. 1D). Voucher specimens are deposited at the IBSP. Photographs were taken with a Leica DFC 500 digital camera mounted on a Leica MZ16A stereomicroscope at the IBSP. Focus-stacked images were composed with Leica Application Suite (ver. 2.5.0, Leica Microsystems). The slide-mounted specimen was examined using phase contrast (PH) and differential interference contrast (DIC)

techniques.

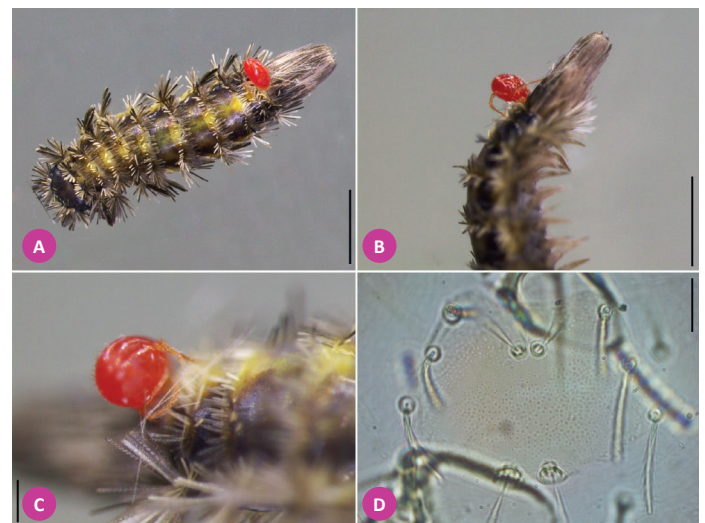


Figure 1. Living specimen of *Charletonia rocciai* parasitizing the Polyxenidae specimen. A - Dorsal view; B - Lateral view of posterior region of Polyxenidae specimen; C - Anal view of posterior region; D - Prodorsal sclerite of *C. rocciai*. Scale bars: A, B = 1 mm; C = 200 μ m; D = 20 μ m.

The observation was recorded on December 6th, 2023, at 1 pm. One specimen of *C. rocciai* in larval stage was found attached to trichomes on the posterior region of a species of Polyxenidae (Fig. 1) by the second and third authors at the Butantan Institute (located at 23°33'52.4"S, 46°43'16.2"W) (Fig. 2A). Also, the gnathosoma was found attached on the millipede. Following a brief observation in the area (Fig. 2B), no other specimen of millipede was observed associated with any mite.

For polyxenid species, the shedding of trichomes on the posterior region serves as a defensive mechanism, given that their cuticles are soft, not calcified, and unable to produce any chemical defense. Reports of polyxenids using these trichomes for protection against ants are common (Eisner et al. 1996), making this case of mite parasitism surprising.



Figure 2. Map of the record of *Charletonia rocciai* parasitizing the Polyxenidae specimen. A - Map of São Paulo state and the exact location of the record (in red star); B - Place where the specimens were found.

Since polyxenids are commonly found in urban areas, the observation of instances of mite parasitism would not be unexpected. The locality where the millipede was found associated with *C. rocciai* is a partially preserved urban green area featuring patches of the secondary forest, but externally bordered by extensive roadsides and buildings. Despite the prevalence of exotic and ornamental plant species in this area, it boasts a remarkably diverse community of insects (Vieira-Silva et al. 2023). However, until the present study, no other records have been made regarding a millipede species as a host of *C. rocciai*. In this regard, further investigations are essential to comprehend this ecological interaction.

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Authors' Contributions

LFMI: Conceptualization, Writing-original draft, Editing; ECO: Conceptualization, Investigation, Writing-review; CTP: Conceptualization, Investigation; RBS: Writing-review, Editing; RSB: Writing-review; FCJ: Supervision, Writing-review, Editing.

Conflict of Interest Statement

The authors declare that there is no conflict of interest related to the publication of this manuscript.

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