

First record of *Myrmecophilus (Myrmecophilus) quadrispinus* for Peru and South America (Orthoptera, Myrmecophilidae)

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Abstract

The first record of the ant cricket *Myrmecophilus (Myrmecophilus) quadrispinus* Perkins, 1899 for Peru and South America is presented. This species was discovered in the city of Lima in the nests of the ant species *Brachymyrmex cordemoyi* Forel, 1895, and *Pheidole* sp. Westwood, 1939 under a square brick and a stone in two urban gardens.

Keywords

ants, faunistics, first record, myrmecophiles, neotropics, South America

Introduction

Ant crickets of the genus *Myrmecophilus* Berthold, 1827 are small orthopterans known to live as guests in ant nests. Their main distinctive morphological features are their minute size, wingless and ovoid body, slightly long antennae, and oversized hind femora. Their specific body color and the number of spurs on the hind leg are diagnostic characteristics along with the male genitalia and female ovipositor's shape variability (Desutter-Grandcolas 1997, Hebard 1920, Stalling and Birrer 2013, Hsu et al. 2020). Ant crickets are myrmecophiles that live among ants in their nests, probably developing mimicry without inducing aggressive behavior (Hölldobler 1947). *Myrmecophilus* species can be associated with dozens of ant species (Hölldobler 1947, Masloski and Greenwood 2013). Some *Myrmecophilus* species are host-specific, whereas other species are host-generalists and use a wide range of host ant species (Komatsu et al. 2009). Living in the ant nests, they enjoy stable environmental conditions, easy access to food, and a place to hide (Hölldobler and Wilson 1990, Iorgu et al. 2021). Past studies have shown that they primarily feed on the secretions resulting from strigilating their legs with their body and participating in trophallaxis with the ants by imitating their grooming behavior (Wheeler 1900, Wetterer and Hugel 2008).

To date, the genus *Myrmecophilus* includes 63 valid species from three subgenera that have been described worldwide (Hsu et al. 2020, Cigliano et al. 2022). From South America, only *Myrmecophilus (Myrmophilina) americanus* Saussure, 1877 was reported in Brazil and Colombia (Saussure 1877, Wasmann 1905, Wetterer and Hugel 2008). The genus was also found in Peru by Mónica Narrea Cango (unpublished data), but these findings were never published and the species remained unidentified.

Methods

Ant nests were checked for ant crickets in Lima (Peru) in 2020 and 2021, by the first author. The ant nests were found by turning square bricks and stones from gardens in a 450-m radius around the first author's house. The specimens were caught, frozen, and then preserved in 96% ethanol. Two specimens were preserved in the collection of the first author, which were identified to the family level using the dichotomous keys in Borror and Delong's Introduction to the Study of Insects 7th ed. (Triplehorn and Johnson 2005). *Myrmecophilus* identification was performed using the criteria of Desutter-Grandcolas (1997), Hsu et al. (2020) and by direct comparison with specimens of *Myrmecophilus (Myrmecophilus) quadrispinus* Perkins, 1899 from France (oversea department Réunion), Japan, and Taiwan and with specimens of *Myrmecophilus (Myrmophilina) americanus* from Taiwan, Malaysia and Israel, which are deposited in the collection of Thomas Stalling. The ants associated with the *Myrmecophilus* specimens were also collected. The identification was performed following Bolton (1994) and Ortiz (2012) and with the kind support extended by Claudia M. Ortiz Sepúlveda for the identification of *Brachymyrmex cordemoyi* Forel, 1895. The *Pheidole* species has not been further identified. Around one hundred *Pheidole* species are known from Peru, some of which are difficult to identify. The cockroaches associated with the *Brachymyrmex* ant species found were identified following Anisutkin (2018) and Roth (1998).

Results and discussion

Family Myrmecophilidae Saussure, 1874
 Subfamily Myrmecophilinae Saussure, 1874
 Tribe Myrmecophilini Saussure, 1874

Myrmecophilus (Myrmecophilus) quadrispinus Perkins, 1899

Material examined.— PERU • 1 adult ♀; Lima province, Lima; 12°06'19.2"S, 76°58'13.3"W, 170 m a.s.l.; July 2020; in the nest of *Brachymyrmex cordemoyi* Forel, 1895, leg. Nicolás Yuan Naveda • 1 adult ♀; Lima province, Lima; 12°6'25.319"S, 76°58'21.238"W, 169 a.s.l., November 2020; in the nest of *Pheidole* sp., leg. Nicolás Yuan Naveda • 1 adult ♂, Lima province, Lima, 12°6'25.319"S, 76°58'21.238"W, 169 a.s.l., November 2021, leg. Nicolás Yuan Naveda.

A first adult female of *M. (M.) quadrispinus* was found in July 2020 and a second adult female in November 2020. Both specimens were found and collected from an ant nest under a square brick and a stone, respectively. An adult male specimen was found and collected in November 2021, in an ant nest under a stone. The habitat associated with the gardens was an urban area with several houses, buildings, tracks, sidewalks, and parks (Fig. 1).

The three adult specimens were identified as *M. (M.) quadrispinus* on the basis of their unique combination of characters: uniform dark brown coloration of the head and body, yellowish cerci (Fig. 2), three dorsal spines positioned in the proximal, medial and distal portions of the metatarsus and outer ovipositor valvae of female (viewed laterally) double pointed (Fig. 3). All other *Myrmecophilus* species show either a different coloration of the body or cerci, a different shape of the ovipositor, or a different number or position of the spines on the tarsus. The *Myrmecophilus* species of North America are distinguished by body color (pale ochreous in *M. (Myrmecophilus) manni* Schimmer, 1911 and *M. (Myrmecophilus) nebrascensis* Lugger, 1898) and by the color of the cerci (dark brown in *M. (Myrmecophilus) pergandei* Bruner, 1884 and *M. (Myrmecophilus) oregonensis* Bruner, 1884), among other characteristics.

Additionally, the ants found associated with the female specimens were identified as *Brachymyrmex cordemoyi* Forel, 1895, and *Pheidole* sp. Westwood, 1939. The first species coexisted with the cockroach *Pycnoscelus surinamensis* (Linnaeus, 1758). This finding agrees with those of Moretti et al. (2011) indicating that *B. cordemoyi* may be associated with *P. surinamensis* and hence exhibiting domiciliation trend. No ants were detected associated with the male specimen, but the site was only three meters from where the second female was found.

Ant cricket nymphs were also found, but they fled away. Both nymphs and adults were mixed in ant colonies. *B. cordemoyi* and *Pheidole* sp. host ants are smaller than *M. (M.) quadrispinus* adults.

The finding of *M. (M.) quadrispinus* represents the first record for Peru and all South America. *M. (M.) quadrispinus* was previously known from the tropics and subtropics of southeast Asia and the Indian Ocean (Hsu et al. 2020). The ant crickets are difficult to find because of their cryptic mode of living in the ant nests. Therefore, we can assume that *M. (M.) quadrispinus* or other *Myrmecophilus* species can be found in other regions of Peru and South America in the future.



Fig. 1. Habitat of *Myrmecophilus (Myrmecophilus) quadrispinus*; Peru, Lima, November 2020. Photo: NYN.



Fig. 2. *Myrmecophilus (Myrmecophilus) quadrispinus*, female; Peru, Lima, July 2020. Habitus, showing the typical shape and uniform brown body color of the species. Photo: NYN.

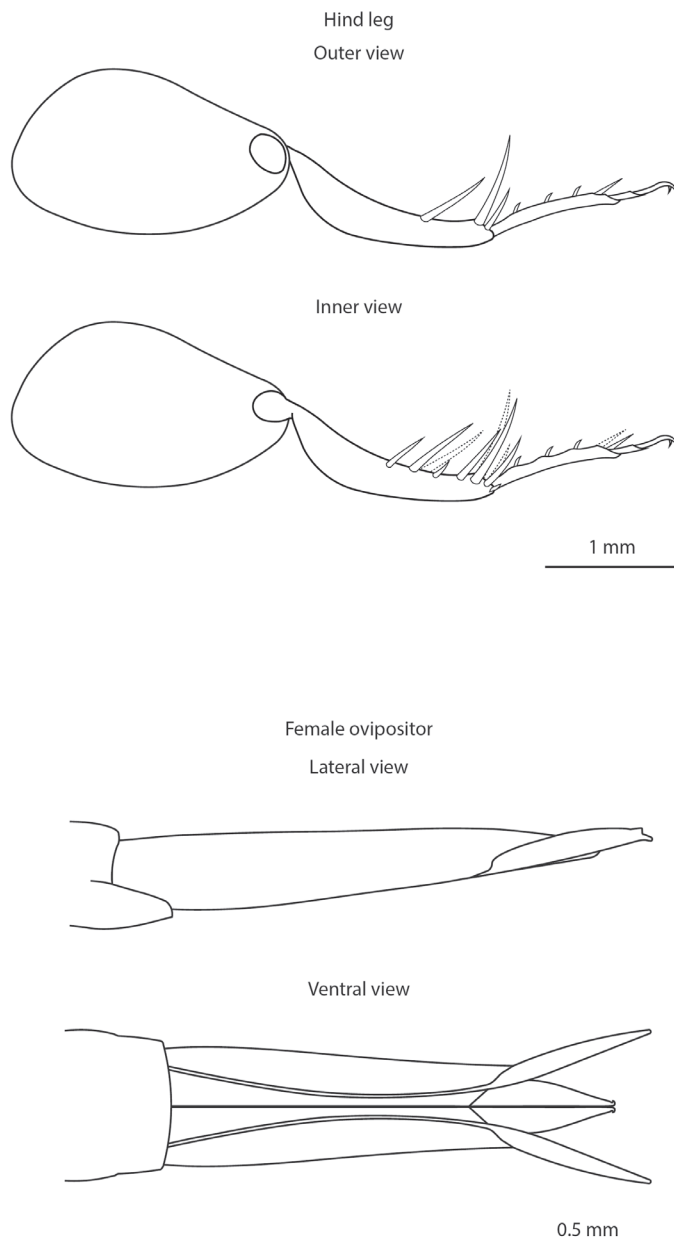


Fig. 3. *Myrmecophilus* (*Myrmecophilus*) *quadrispinus*, female; Peru, Lima, July 2020. Details of the hind leg and the ovipositor of a female. Illustration: NYN.

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