

Rapid Communication**First report in South America of the ground beetle
Mochtherus tetraspilotus (Macleay, 1825) (Carabidae, Lebiini, Pericalina)**

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Citation: Torres-Domínguez DM, Arenas-Clavijo A, Londoño-Sánchez C, Armbrecht I, Montoya-Lerma J (2020) First report in South America of the ground beetle *Mochtherus tetraspilotus* (Macleay, 1825) (Carabidae, Lebiini, Pericalina). *BioInvasions Records* 9(1): 44–49, <https://doi.org/10.3391/bir.2020.9.1.06>

Received: 19 June 2019

Accepted: 3 November 2019

Published: 17 December 2019

Handling editor: Angeliki Martinou

Thematic editor: Stelios Katsanevakis

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OPEN ACCESS**Abstract**

Specimens of *Mochtherus* (Coleoptera: Carabidae) found in several locations in Valle del Cauca, Colombia were identified as *M. tetraspilotus*. This represents the first report of this exotic species, native to Asia, in Colombia and South America. Location data, habitat and photographic record of the species are provided.

Key words: Colombia, introduced species, predatory insects, species distribution

Introduction

Mochtherus Schmidt-Gobel, 1846 is a genus of Carabidae (Harpalinae: Lebiini: Pericalina) native to several Asian countries: Japan, Burma, the Philippines, Laos, Taiwan, Borneo, Java, Ceylon, and India (Jedlička 1963; Habu 1967; Darlington 1968; Choate 2001; Hunting and Yang 2019). However, *Mochtherus tetraspilotus* (Macleay, 1825) has been introduced into the Americas, where it was first detected in United States in 1992 from Palm Beach Co., Highlands Co., and Alachua Co., Florida (Choate 2001). Gil (2008) mentioned this species was previously collected in Louisiana, in the New Orleans East area, and confirms that *M. tetraspilotus* has expanded its range farther north in this state, suggesting *M. tetraspilotus* is established in this country. However, until now, there were no reports of its occurrence or migration into Central or South America (Figure 1).

The genus that is made up of at least 10 species and individuals range in body length from 6–8 mm. Recently, while doing a taxonomic review of Pericalina specimens at the Entomological Museum of the Universidad del Valle (Cali-Colombia) we found some unidentified specimens that were morphologically compatible with *M. tetraspilotus*. Historically, this eco-area represents a deciduous dry forest, mixed with evergreen dry forest, and a gallery forest along the Cauca River, connected with the biogeographic Chocó area (Holdridge 1967).

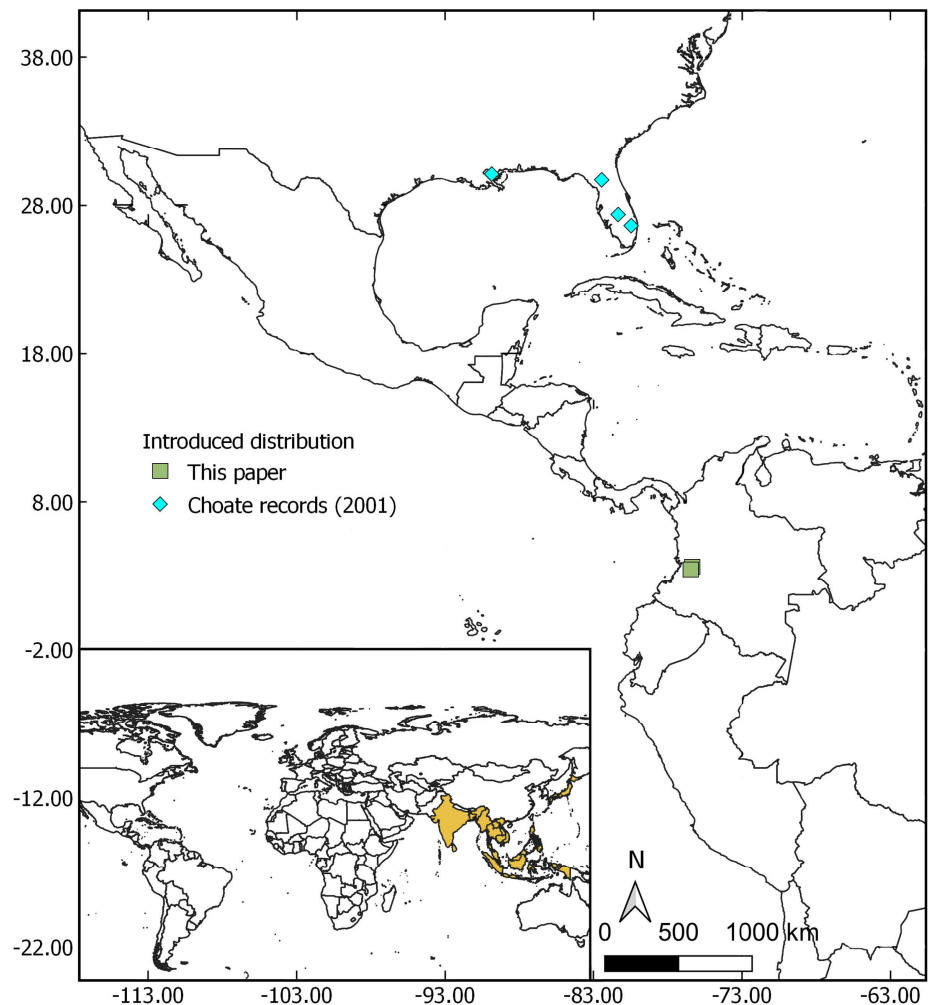


Figure 1. Native (Asia in yellow-bottom left) and introduced distribution of *Mochtherus tetraspilotos* (for details see Supplementary material Tables S1 and S2).

The aim of this work is to report the presence of *Mochtherus tetraspilotos* for the first time in South America and provide relevant information such as detailed photographic material of the habitus, habitat and updated distribution for the species.

Materials and methods

We detected the presence of *Mochtherus tetraspilotos* from one specimen collected manually in pseudostem residues of banana crops in the year 2018 at a locality of Valle del Cauca, Colombia. To confirm the presence of this Asian beetle, we conducted three types of searches: first, review of specimens deposited at Museo de Entomología de la Universidad del Valle. Second, we visited the recorded collection sites of the species where they have registered in Valle del Cauca, Colombia to corroborate the extension of the species range. Ecologically, both areas correspond to dry tropical forest (Holdridge 1967). Finally, we reviewed records from Global Biodiversity Information Facility database (GBIF 2019), including both native and introduced distribution. Data debugging included the removal of suspicious

Table 1. Morphological data of *Mochtherus tetraspilotos* collected in banana plot at Bolo Alizal village, Palmira, Colombia, mean and range in parentheses (mm). ABL: apparent body length, SBL: standardized body length, TW: total width.

Specimen sex	ABL	SBL	TW
Male (N = 9)	6.58 (6.2–7.0)	5.95 (5.6–6.2)	2.90 (2.7–3.2)
Female (N = 6)	6.61 (6.1–7.0)	5.93 (5.4–6.3)	2.93 (2.7–3.2)

records containing the following warnings: “Taxon match fuzzy”, “Basis of record invalid” and “Country derived from coordinates”; only records with “Preserved specimen” specification were considered in this document.

Specimens examined: COLOMBIA • ♀; Valle del Cauca, Palmira, Bolo Alizal, La María; 3°27.41'N; 76°21.37'W; 990 m a.s.l.; 07.VII.2016; C. Londoño leg.; MUSENUV-P-178; COLOMBIA • ♂; Valle del Cauca, El Cerrito, Reserva Natural El Hatico; 3°38.5743'N; 76°19.735'W; 990 m a.s.l.; 25.I.2006; P. Chacón leg; in sugarcane crop; MUSENUV-26227. COLOMBIA • 9♂♂; Valle del Cauca, Palmira, Bolo Alizal, La María; 3°27.41'N; 76°21.37'W; 28.II.2019; 990 m; col. C. Londoño, A. Arenas leg; in banana crop; MUSENUV-P223–P231. • 6♀♀; same data as for preceding; MUSENUV-P232–P237.

Results

In the search at Museo de Entomología de la Universidad del Valle, we found one additional specimen of *M. tetraspilotos*, it was collected in pitfall traps from El Cerrito, Reserva Natural El Hatico in Valle del Cauca, Colombia (Supplementary material Table S1). On 28 February 2019, on the recorded collection sites of the species, we collected and measured 15 individuals (Table 1, measurements *sensu* Boyd and Erwin 2016), all of them within the pseudostem of banana plants from Bolo Alizal village (Palmira Municipality). Specimens were found in piles of harvested plants waiting to be discarded (Figure 2). No beetle specimens were found at Reserva Natural El Hatico (El Cerrito Municipality) during a recent visit on 9 November 2018. Finally, thirty-three deputed records of *M. tetraspilotos* were obtained from GBIF data, most records were from Malaysia (20), followed by Taiwan (3) and Japan (3) (Table S2).

All, collected and preserved specimens, exhibited similar morphological characters cited by Jedlička (1963), Choate (2001) and, more recently, by Hunting and Yang (2019) (Figure 3): hind tarsomere four is not bilobed; tarsal claws with three teeth: a large outer tooth and two smaller inner teeth; mentum toothed; elytral interval three with two dorsal punctures; labial palpi slender; pronotum setose (covered with short hairs that are best viewed with side lighting) and the most easily observed character is the presence of two yellowish-orange spots on each elytron. A humeral spot extends from intervals four or five to seven or eight, and a subapical spot covers the intervals two to five.



Figure 2. Habitat of *Mochtherus tetraspilotus* in Colombia. A, pseudostem residues of banana crops; B, harvest incisions in banana pseudostem, dwelling microhabitat of *M. tetraspilotus*; C, detail of microhabitat of *M. tetraspilotus*. Photo by DMTD, CLS and AAC.

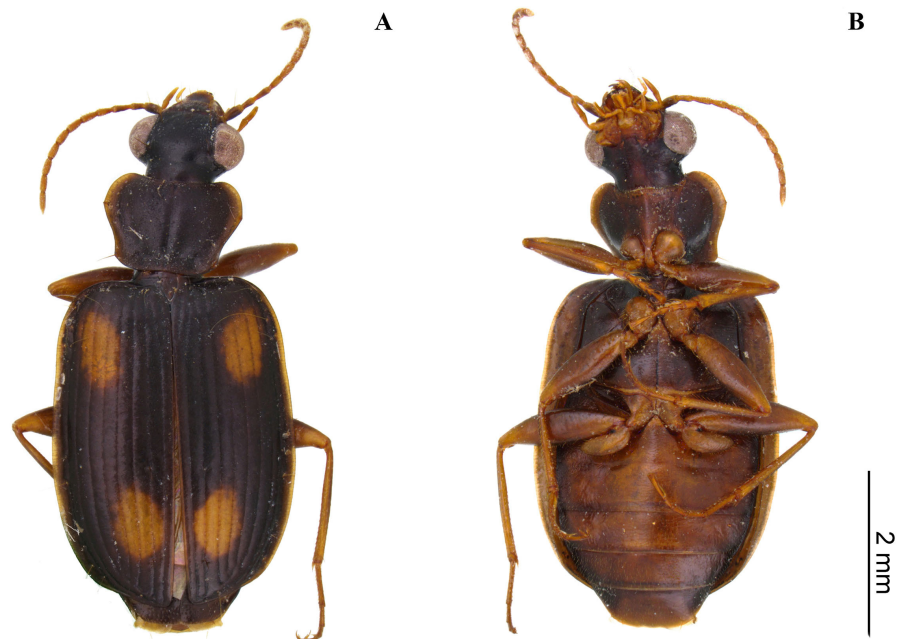


Figure 3. Habitus *Mochtherus tetraspilotus*. A, dorsal view; B, ventral view. Photo by Juan Felipe Ortega and DMTD—Laboratorio de imágenes del Posgrado en Ciencias-Biología (Universidad del Valle).

Discussion

This work is the first to record the presence of *Mochtherus tetraspilotus* in South America. In Colombia, *Mochtherus tetraspilotus* was found associated with leaf litter and pseudostem residues of banana crops and with tropical dry forests soil, which added to the reports of Darlington (1968) and Choate (2001) who mention that adults of *M. tetraspilotus* have been

observed scurrying along recently fallen logs in Florida. Specimens have been also collected on recently fallen logs where they actively run about, predated small insects and some individuals have been collected from artificial lights (Choate 2001). Ball and Bousquet (2001) mention that this beetle is arboreal, like other pericalines, with adults occurring on trunks and branches of standing or fallen trees, and Gil (2008) reported one single specimen obtained in the study from loblolly pine (*Pinus taeda*), two weeks after the tree had fallen. In Asia adults are crepuscular or nocturnal; they are found in mixed primary and secondary forest of montane areas, as well as disturbed areas (Hunting and Yang 2019). Currently, there is little reliable knowledge of this species distribution in the Americas or how it had dispersed. The oldest Colombian records are from a secondary dry forest fragment and in sugarcane. More recently, in plantain crops, individuals responded actively after disturbing their resting sites early in the morning, but most of its natural history is yet unknown in this new distribution range.

According to Choate (2001), the pest status of this species is unknown, but adults of this group of Carabidae are known to be predators. The source of its introduction as well impact on Colombian native species remains to be determined. For instance, in the United States although the impact of *Mochtherus* is still unknown, it occupies the same habitat as the native carabid species, *Coptodera aerata* Dejean, 1825. In Colombia, this species has been found in the same habitat of other native species of Carabidae from the genera *Micratopus*, *Notiobia*, *Perigona* and *Selenophorus* (Arenas-Clavijo and Chacón de Ulloa 2016; *Mochtherus* specimen was misidentified as *Coptodera*) hence, under the caution principle, the negative impact on native fauna must be always suspected.

Acknowledgements

We thank Danny Shpeley (Strickland Museum-University of Alberta) for the taxonomic confirmation of the species. Nicolás Velasco for his valuable collaboration in the field, the *Laboratorio de imágenes del Posgrado en Ciencias-Biología* (Universidad del Valle), as well as special thanks to Juan Felipe Ortega for assistance with photographs. David Pearson (Arizona State University) provided comments on English spelling and syntax of first submitted version. We are grateful to two reviewers, who improved the original version of this paper.

Funding Declaration

This work received funding under the auspices of the project “*Desarrollo de tecnologías innovadoras para el manejo integrado de plagas y enfermedades limitantes de plátano y banano en el Valle del Cauca*” CI-71032 funded by the *Fondo de Ciencia, Tecnología e Innovación del Sistema General de Regalías and the Universidad del Valle*. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Authors' Contribution

DMTD Investigation and data collection, data analysis and interpretation, writing – original draft. AAC: Investigation and data collection, data analysis and interpretation, writing – original draft. CLS: Investigation and data collection, writing – original draft. IA: Research conceptualization, sample design and methodology, writing – review and editing. JML: Research conceptualization, sample design and methodology, writing – review and editing.

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Supplementary material

The following supplementary material is available for this article:

Table S1. Records of *Mochtherus tetraspilotus* (McLeay, 1825) in the Americas.

Table S2. Distribution records of *Mochtherus tetraspilotus* (McLeay, 1825) obtained and adapted from GBIF.

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