



## Research article

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# A new species of the ant genus *Bothriomyrmex* Emery, 1869 (Hymenoptera: Formicidae) from the Caribbean region

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**Abstract.** *Bothriomyrmex enigmaticus* sp. nov. is described from the island of Hispaniola based on one nest collection. This is the first collection of the genus *Bothriomyrmex* (Emery, 1869) from the Caribbean region, and the second species to be described from the Americas. While sharing several characters with *B. paradoxus* (Dubovikoff & Longino, 2004) from Costa Rica and Honduras, *B. enigmaticus* sp. nov. diverges in several key characters, including palp formula. However, a morphometric comparison to Palearctic species of the tribe Bothriomyrmecini suggests affinities to *B. paradoxus*, *Chronoxenus wroughtoni* (Forel, 1895) of the eastern Palearctic, and to a lesser extent an undescribed species of *Arnoldius* (Dubovikoff, 2005) from Australia and *B. corsicus* (Santschi, 1923) of the western Palearctic.

**Keywords.** Bothriomyrmecini, Dolichoderinae, Greater Antilles, disjunct distribution, Neotropic.

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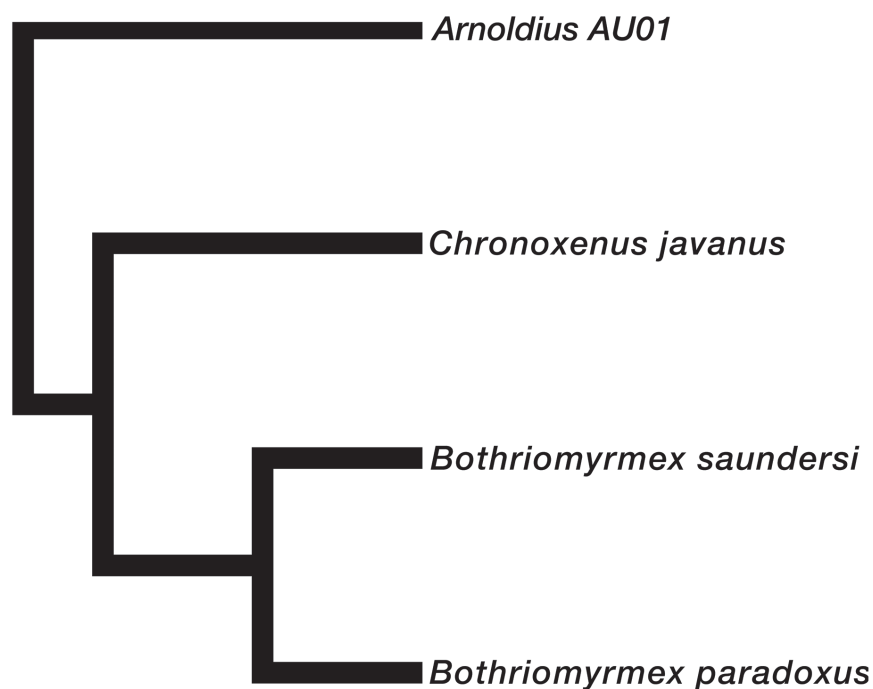
## Introduction

*Bothriomyrmex* (Emery, 1869), with 23 described species (Bolton, 2014), is a small genus of ants in the subfamily Dolichoderinae (Forel, 1878). With an unusual distribution, encompassing the Palearctic and Neotropic regions, *Bothriomyrmex* has been collected in a broad range of habitats, including grassland, savannah, lowland tropical moist forest and cloud forest. Nests typically occur in the soil, under rocks or in rotten wood. While little is known about the diet of many species, Santschi (1919) noted that *Bothriomyrmex* preferred a diet of sugar water, and observed a nest of *B. crosi* (Santschi, 1919) with nymphs of *Tettigometra* (Latreille, 1804), suggesting trophobiosis as one source of nutrition. Other details of the life history of many species remain obscure, but Forel (1873) was the first to observe a mixed colony of *B. meridionalis* (Roger, 1863) and *Tapinoma erraticum* (Latreille, 1798) in Switzerland. Later, in North Africa, Santschi (1906) observed that newly mated queens of *Bothriomyrmex* invade colonies of *Tapinoma* and usurp their nests by decapitating the queen over the course of several days,

suggesting that at least in some cases *Bothriomyrmex* is a temporary social parasite. Due to the peculiar mandibular morphology of all known gynes in this genus, Seifert (2012) asserted that all species of *Bothriomyrmex* are temporary social parasites, with nest founding strategies similar to the one observed by Santschi. A study by Lloyd *et al.* (1986) suggested that the anal gland secretions of *B. syrius* (Forel, 1910) gynes facilitate their entrance into host nests, via chemical mimicry of the *Tapinoma* colony odor.

In 2004, a new species of *Bothriomyrmex*, *B. paradoxus* (Dubovikoff & Longino, 2004), was described from material collected in Costa Rica; further collections were made in mesophyll forest in Honduras during the 2010 Leaf Litter Arthropods of Meso-America (LLAMA) expedition. Prior to this, this genus was considered to be geographically restricted to the Palearctic, Oriental and Australian regions. Recently, *Bothriomyrmex* was separated into 3 geographically graded genera based on palp formula and gyne wing venation (see Table 1): *Bothriomyrmex* s.s., with 23 described species from the Palearctic region; *Chronoxenus* (Santschi, 1919), with 6 described species from the Oriental region; and *Arnoldius* (Dubovikoff, 2005), with 3 species from the Australian region (Dubovikoff 2005). *Bothriomyrmex paradoxus*, with palp formula 4,3 and a closed discoidal cell, is thought to be a member of *Bothriomyrmex* s.s.: indeed, a 2010 study in which the molecular phylogeny of the subfamily Dolichoderinae was estimated provided additional evidence for this argument (Ward *et al.* 2010, see Fig. 1).

In this article we describe a second species of *Bothriomyrmex* from the Americas. This species was found on the the island of Hispaniola, marking the first record of this genus in the Caribbean region. Additionally, we utilize a morphometric dataset developed by Seifert (2012) in an effort to develop a hypothesis that could explain the disjunct distribution of this genus.



**Fig. 1.** Phylogenetic relationships among three closely related genera in the tribe Bothriomyrmecini, based on Ward *et al.* (2010).

**Table 1.** A summary of characters separating three closely related genera in the tribe Bothriomyrmecini, based on Dubovikoff (2005). \*2,3 in *Bothriomyrmex enigmaticus* sp. nov. (this study).

	palp formula	gyne forewing venation	biogeographic region
<i>Bothriomyrmex</i> s.s.	4,3*	closed discoidal cell	Palaearctic, Neotropic
<i>Chronoxenus</i>	2,3	closed discoidal cell, reduced cubital and medial veins	Oriental
<i>Arnoldius</i>	2,2	open discoidal cell	Australian

## Material and methods

### Abbreviations of depositories

The material upon which this study is based is located and/or was examined at the following institutions:

- CAS = California Academy of Sciences, San Francisco, CA, USA  
 INBio = Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica  
 LACM = Los Angeles County Museum of Natural History, Los Angeles, CA, USA  
 MNHNSD = Museo Nacional de Historia Natural “Prof. Eugenio de Jesús Marcano”, Santo Domingo, Dominican Republic  
 MHNG = Muséum d’Histoire Naturelle, Geneva, Switzerland.  
 MCZ = Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA  
 UCDC = University of California, Davis, Davis, CA, USA  
 USNM = National Museum of Natural History, Washington, DC, USA.  
 ZIN = Zoological Institute, Russian Academy of Sciences, Saint Petersburg, Russia

In this study we compare the morphology of *Bothriomyrmex paradoxus* and *B. enigmaticus* sp. nov. Because the holotype of *B. paradoxus* is a gyne, and the gyne of *B. enigmaticus* sp. nov. remains unknown, we examined paratype workers of the former as a basis for comparison. These paratypes came from the collections of CAS [JTLC000003512] (images examined on [www.antweb.org](http://www.antweb.org)), MHNG [CASENT0103277] (images examined on [www.antweb.org](http://www.antweb.org)), and UCDC [JTLC000003511].

The type material of the new species and all imaged specimens are uniquely identified with specimen-level codes affixed to each pin (e.g. CASENT0636109). Digital color images and measurements were taken using a Leica MZ 12.5 stereo microscope equipped with a JVC KY-F75 digital camera and Syncroscopy Auto-Montage software (version 5.0). All images were taken by the authors, except where indicated. The images and specimen data presented are available online and can be viewed on AntWeb ([www.antweb.org](http://www.antweb.org)). Measurements and indices are presented as minimum and maximum values, expressed in mm to three decimal places, with arithmetic means in parentheses. The following measurements are derived from those used by Seifert (2012) and Dubovikoff & Longino (2004).

### Measurements

- CL = Cephalic length: maximum distance from the mid-point of the anterior clypeal margin to the mid-point of the posterior margin of head, measured in full-face view  
 ClyW = Maximum clypeal width in full face view  
 CS = Cephalic size; arithmetic mean of CL and CW  
 CW = Cephalic width: maximum width of head measured in full face view, excluding the eyes  
 dAN = Minimum distance between the inner margins of the toruli (the ring sclerites surmounting and enclosing the antennal sockets)  
 EL = Eye length: maximum diameter of compound eye including all structurally visible ommatidia

- irrespective of the pigmentation status, measured in oblique lateral view
- EW = Eye width: minimum diameter of compound eye including all structurally visible ommatidia irrespective of the pigmentation status, measured in oblique lateral view
- EYE = Eye size: arithmetic mean of EL and EW
- F2 = Median length of 2<sup>nd</sup> funicular segment in dorsal view; take care to measure median length because of unequal length of the segments' sides. Use the highest optical resolution available
- IF2 = F2 divided by the maximum width of second funicular segment (excluding pubescence) in dorsal view
- MGr = Depth of metanotal groove/depression in profile view; the upper reference line extends between the highest points of mesonotum and propodeum perpendicular to which depth measuring is performed. Use of transmitted light ensures the most accuracy
- MW = Pronotal width: maximum width of pronotum measured in dorsal view
- PoOc = Postocular distance: distance from the transverse level of posterior eye margin to hind margin of head, measured medially
- PH = Petiole height: maximum height of the petiole in profile view, including protruding lobe on the ventral margin
- PrL = Propodeal length: distance from most caudal point of posterior propodeum (a dentiform paramedian structure on both sides of petiolar junction) to hind the margin of the metanotal groove
- SL = Scape length: maximum antennal scape length excluding basal condyle and neck
- WL = Weber's length: the diagonal length of the mesosoma in profile from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron

The varying degree of inclination of pubescence and pilosity is often of high diagnostic value throughout a broad spectrum of ant genera. In this context we use the terms “erect”, “suberect”, “subdecumbent”, “decumbent”, and “appressed” following the usage in Wilson (1955).

## Results

Class Hexapoda Blainville, 1816  
Order Hymenoptera Linnaeus, 1758  
Suborder Apocrita Latreille, 1810  
Family Formicidae Latreille, 1809  
Subfamily Dolichoderinae Forel, 1878  
Tribe Bothriomyrmecini Dubovikoff, 2005  
  
Genus *Bothriomyrmex* Emery, 1869

### Synopsis of Neotropical *Bothriomyrmex* species:

*Bothriomyrmex paradoxus* (Dubovikoff & Longino, 2004)

*Bothriomyrmex enigmaticus* sp. nov.

*Bothriomyrmex enigmaticus* sp. nov.

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Figs 2b–e, 3–4

### Diagnosis

The following character combination distinguishes *Bothriomyrmex enigmaticus* sp. nov. from *B. paradoxus*: palp formula 2,3; medial lobe of clypeus not strongly projecting: flat, or with a broad, shallow concavity anteriorly. Long, paired setae on medial clypeal lobe separated by  $\frac{2}{3}$  their length or more. Eyes large: OI 23.1–24.7. Head box-like, with occipital corners narrowly rounded.

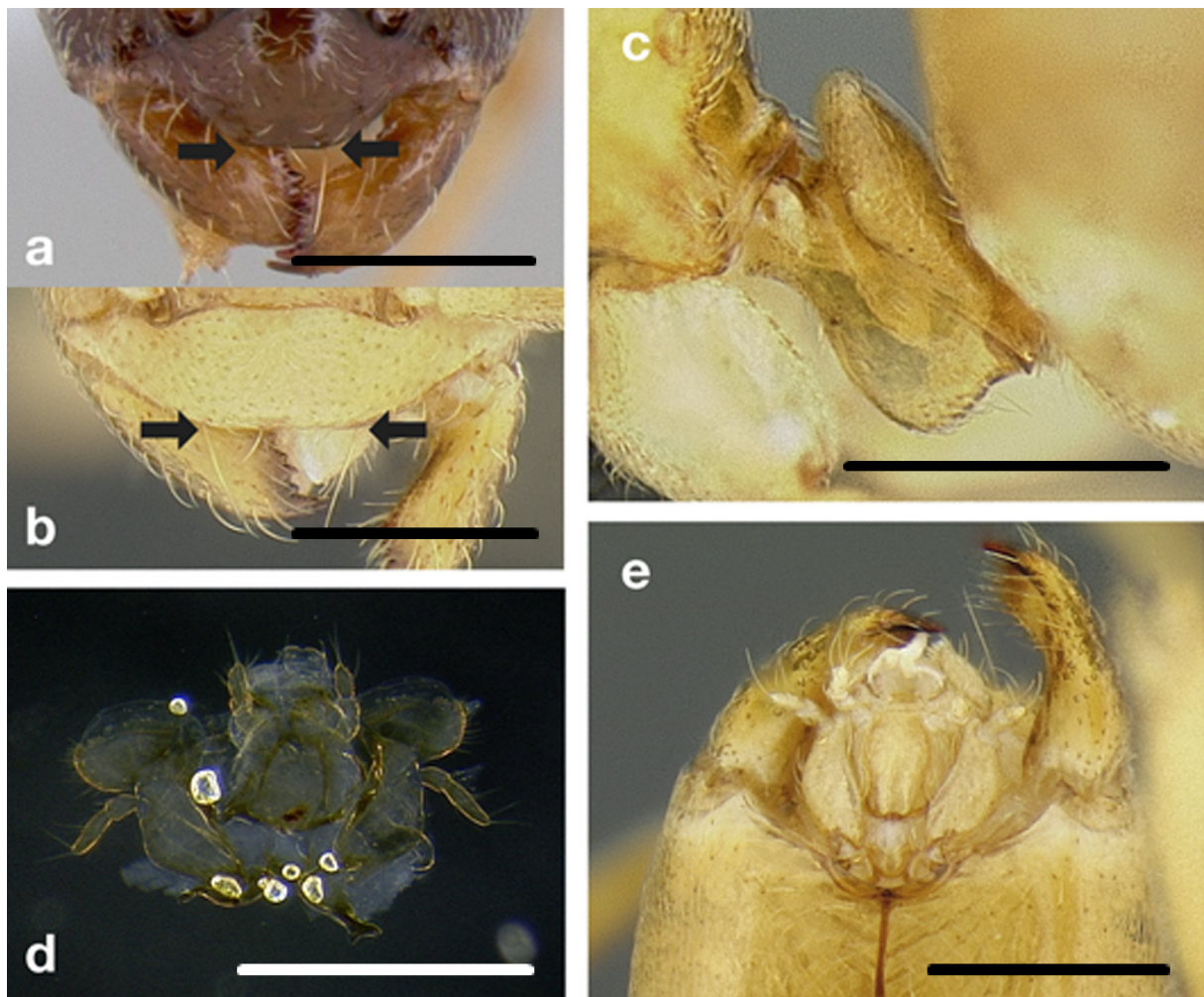
### Etymology

The specific epithet is derived from the ancient Greek “ανιγματικός”, meaning “riddle”, and bears a double entendre: not only is this the second species in this genus with a paradoxical distribution, this species also presents a puzzling new perspective on the generic classification system of the tribe Bothriomyrmecini.

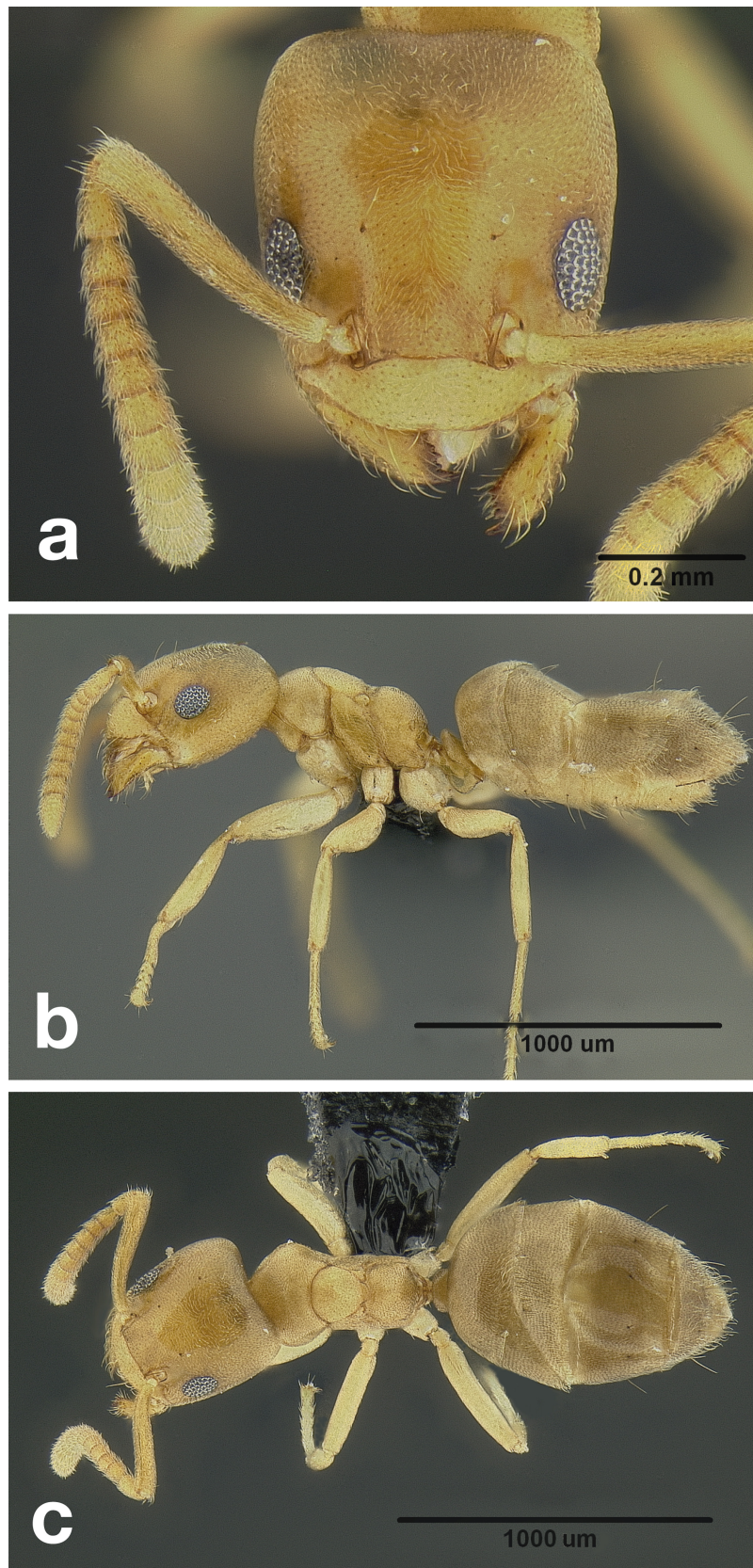
### Type material examined

#### Holotype worker

DOMINICAN REPUBLIC: Provincia Maria Trinidad Sanchez, 7 km WSW El Factor, 19.29776° N, 69.94977° W ±3 m, 195 m ±5 m, 21 Jul. 2015, disturbed broadleaf moist forest, nest in dead top of live tree, M.M. Prebus#MMP01990 [MCZ-ENT00035850].



**Fig. 2.** Clypeal structure. **a.** *Bothriomyrmex paradoxus* (Dubovikoff & Longino, 2004) (JTLC000003511). **b.** *B. enigmaticus* sp. nov. (MCZ-ENT00035850); arrows indicate the insertion points of long setae on anterior clypeal margin. **c.** Petiole. **d.** Mouthpart dissection. **e.** Ventral view of head capsule of *B. enigmaticus* sp. nov. (MCZ-ENT00035850). Photo credit for 2a: Michael Branstetter. All scale bars represent 0.2 mm.



**Fig. 3.** Holotype worker of *Bothriomyrmex enigmaticus* sp. nov. (MCZ-ENT00035850). **a.** Full face view. **b.** Profile view. **c.** Dorsal view.

**Paratypes**

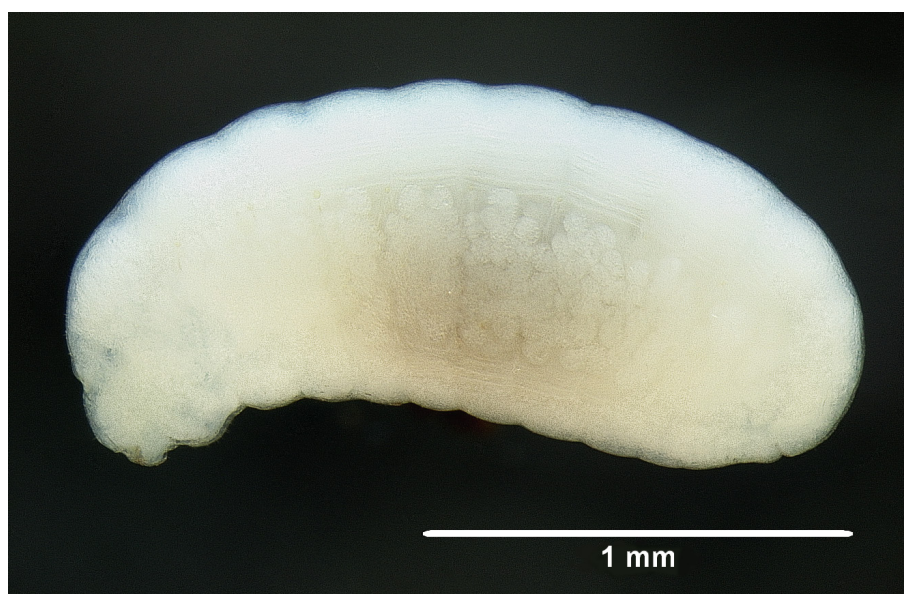
DOMINICAN REPUBLIC: Provincia Maria Trinidad Sanchez, 9 workers, same collection as holotype [CAS: CASENT0756066; INBio: CASENT0756067; LACM: CASENT0756068; MCZ: MCZ-ENT00539146, MCZ-ENT00539147; MNHNSD: MNHNSD 18.106; UCDC: CASENT0756071; USNM: CASENT0756072; ZIN: CASENT0755363].

**Worker description**

Measurements (n=11): CL 0.541–0.563 (0.554); ClyW 0.375–0.412 (0.395); CS 0.520–0.542 (0.531); CW 0.495–0.523 (0.508); dAN 0.181–0.215 (0.197); EL 0.124–0.137 (0.132); EW 0.096–0.109 (0.105); EYE 0.112–0.122 (0.118); F2W 0.062–0.070 (0.065); IF2 1.000–1.222 (1.117); MGr 0.019–0.030 (0.024); MW 0.318–0.357 (0.343); PoOC 0.251–0.274 (0.260); PH 0.214–0.250 (0.231); PrL 0.264–0.296 (0.282); SL 0.407–0.434 (0.424); WL 0.572–0.617 (0.600).

Palp formula 2,3; distal maxillary palp segment roughly twice as long as basal (Fig. 2d). Medial hypostoma absent (Fig. 2e). Masticatory margin of mandible with 6 teeth and 1–2 denticles. Mandibles with short, curved setae similar to those on the anterior clypeal margin. Clypeus narrow: 0.10–0.11 mm high medially. Anterior clypeal margin flat, or with a broad, shallow concavity; bearing many short, curved setae; one long seta on each side of concavity, their bases separated by the length of the setae or more. Medial lobe of clypeus not strongly projecting. Posterior margin of clypeus even with anterior surfaces of antennal socket cavities. Antennal scapes short, not reaching the posterior margin of the head in full face view. Head slightly oblong (CL/CW 1.069–1.108), with lateral margins evenly convex; widest part of head in full-face view posterior to the compound eyes. Posterior head margin flat, becoming slightly concave medially; corners of head narrowly rounded, giving the entire head a blocky appearance. Head with two long setae on frons (longer than the first funicular segment) and two shorter setae on posterior clypeal margin (shorter than the first funicular segment), otherwise covered uniformly with short, dense, decumbant pubescence. Eyes large (EYE/CS 0.214–0.229), 8 ommatidia in longest row.

Posteroventral pronotum margin narrowly rounded. Metanotal groove deeply impressed. Propodeum high and rounded, with declivitous face roughly twice as long as dorsal face in profile; propodeal angle indistinct. Mesosoma covered uniformly with short, dense, decumbent pubescence.



**Fig. 4.** Larva of *Bothriomyrmex enigmaticus* sp. nov., profile view.

Petiole node in profile scale-like and strongly inclined anteriorly, with the anterior face much shorter than the posterior face (Fig. 2c). Ventral margin of petiole with a large lobe. Several setae present on the posteroventral margin of lobe.

Second, third and fourth tergites of gaster with long, erect setae arising from the middle of the tergite: two on the second, six on the third and fourth. First four sternites of gaster also bearing two long setae similar to those found on the tergites. Pubescence similar to the rest of the body, but becoming longer on the posterior margins of the sclerites.

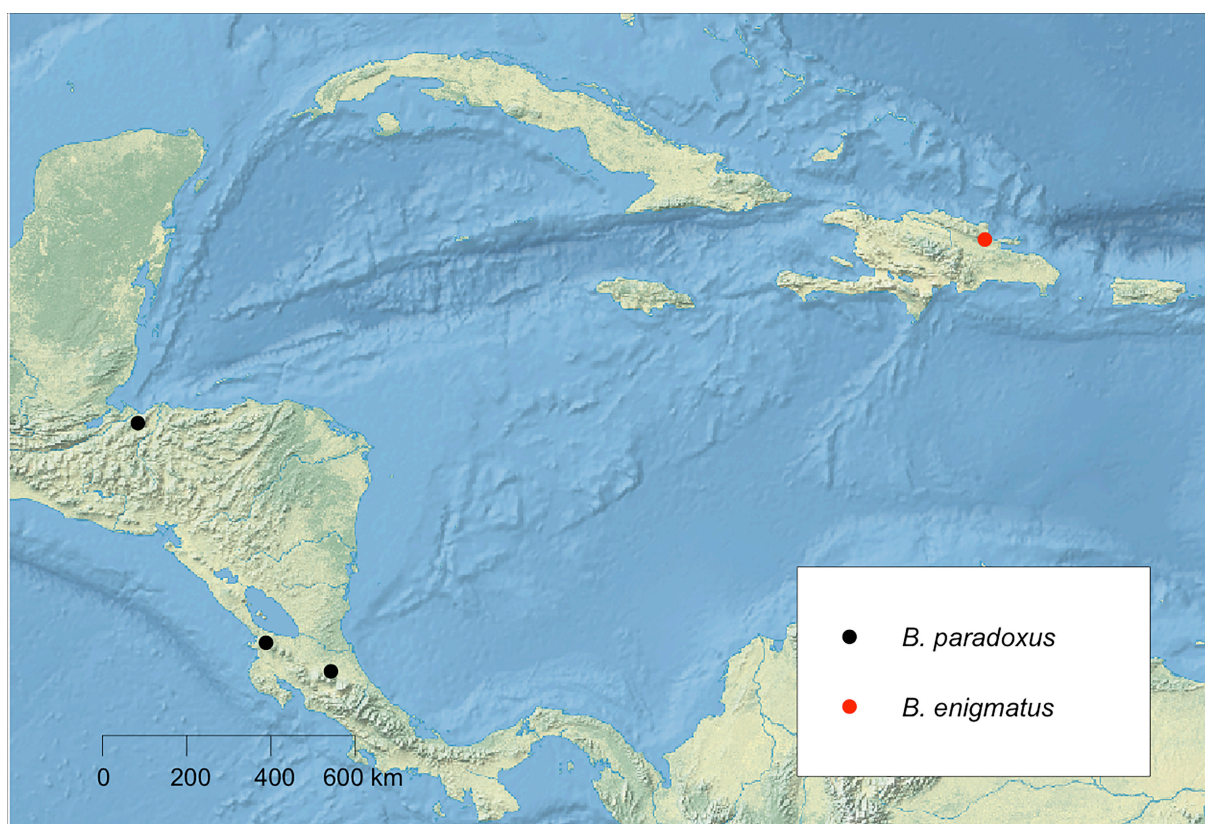
Uniformly light brown; coxae and legs somewhat lighter.

### Larva description

Shape dolichoderoid. Body with two ventrolateral protuberances on prothorax which are fused ventrally by a narrow ridge; setae very short and limited to the prothorax; 8 pairs of spiracles. (Fig. 4).

### Key to Neotropical *Bothriomyrmex* species based on workers

1. Palp formula 4,3 (see fig. 3d in Dubovikoff & Longino 2004); medial lobe of clypeus strongly projecting beyond the lateral lobes; anterior margin evenly rounded to flat, never concave medially; paired long setae on anterior margin of medial lobe separated by less than  $\frac{2}{3}$  of their length (Fig. 2a) ..... *B. paradoxus* (Dubovikoff & Longino, 2004)
- Palp formula 2,3 (Fig. 2d); medial lobe of clypeus weakly projecting; anterior margin flat to broadly concave medially; paired long setae on anterior margin of medial lobe separated by  $\frac{2}{3}$  of their length or more (Fig. 2b) ..... *B. enigmaticus* sp. nov.



**Fig. 5.** Known distribution of *Bothriomyrmex paradoxus* (Dubovikoff & Longino, 2004) and *B. enigmaticus* sp. nov.



### Distribution and ecology

*Bothriomyrmex enigmaticus* sp. nov. is known from one collection on the north side of the island of Hispaniola (Fig. 5). The sampling took place in July 2015 during a Museum of Comparative Zoology expedition to the Dominican Republic. The new ant species was discovered while based at a guardhouse in the Toro Palomo sector on the SE side of the Loma Guaconejo Scientific Reserve, near the village of La Peonía, at 195 m in elevation. M. Prebus collected a partial nest containing workers and brood from decomposing wood at the top of a 1.5 m tall live sapling in the middle of a path leading west from the guardhouse. The habitat was scrubby secondary growth, roughly 100 meters from a more mature secondary lowland moist forest. *Tapinoma litorale* (Wheeler, 1905) was abundant in this habitat; due to the superficial similarity of these two species, *Bothriomyrmex enigmaticus* sp. nov. was mistaken for *T. litorale* in the field. The nest was not mixed; it consisted solely of *B. enigmaticus*.

### Taxonomic notes

Dubovikoff & Longino (2004) came to the conclusion that *Bothriomyrmex paradoxus* is a member of the Palearctic *Bothriomyrmex* s.s. based on palp formula and wing venation. They also noted that it doesn't fit perfectly into species groups in this region: a deeply impressed metanotal groove is found in the *B. gibbus* (Soudek, 1925) group, but the gyne of *B. paradoxus* also has short, suberect setae on the mesosoma and gaster, which is typical of the *B. syrius* (Forel, 1910) group. With its large eyes, deep metanotal groove, and nesting preference, *B. enigmaticus* sp. nov. appears to be closely related to *B. paradoxus*. However, it diverges from the latter in several characters, most notably palp formula. Referring to Shattuck (1992), it appears that a palp formula of 6,4 is probably plesiomorphic in the Dolichoderinae. Within the tribe Bothriomyrmecini there is a trend in palp reduction in *Arnoldius*, *Bothriomyrmex* and *Chronoxenus* (Table 1) that becomes apparent when they are compared with *Loweriella* (Shattuck, 1992) and *Ravavy* (Fisher, 2009), which have palp formula 6,4 and 6,3. It is possible that a palp formula of 4,3 is plesiomorphic in the clade of (*Bothriomyrmex* + *Chronoxenus* + *Arnoldius*), with the latter two genera having undergone subsequent reductions. Within other genera of the Dolichoderinae, e.g., *Technomyrmex* (Mayr, 1872) and *Azteca* (Forel, 1878), palp formula can be highly variable, making generic diagnoses based on this character alone problematic. While the reproductives (and therefore the wing venation) of *B. enigmaticus* sp. nov. remain unknown, if the worker were to be classified based on the current generic diagnoses, one might be inclined to place it in *Chronoxenus* based solely on palp formula. However, the similarities between *B. enigmaticus* sp. nov. and *B. paradoxus* mentioned above are striking, suggesting that these two species are sister taxa and palp formula is a labile character.

### Placement in Bothriomyrmecini and biogeographic notes

#### Material examined

*Bothriomyrmex paradoxus* (Dubovikoff & Longino, 2004)

#### Paratype worker

COSTA RICA: Heredia, La Virgen, 10 km SE La Virgen, 10.33333° N, 84.08333° W, 500 m, 16 Feb. 2003, wet forest treefall gap, under epiphytes, J. Longino #JTL4938 [UCDC: JTLC000003511]

*Chronoxenus wroughtoni* (Forel, 1895)

CHINA: Hong Kong, 1 worker, N.T., Kadoorie Institute Shek Kong Centre, 22.42833° N, 114.11455° E ± 7 m, 220 m, 3 Jul. 2011, secondary rainforest, under stone, P.S. Ward #PSW16602 [UCDC: CASENT0220768].

**Table 2.** Worker morphometric data adapted from Seifert (2012), comparing *Bothriomyrmex paradoxus* (Dubovikoff & Longino, 2004), *B. enigmaticus* sp. nov., *Chronoxenus wroughtoni* (Forel, 1895) and *Arnoldius* (Dubovikoff, 2005) AU01 to *Bothriomyrmex* (Emery, 1869) species from the western Palearctic. Abbreviations: n = number of nest samples; i = number of individuals. Data is expressed as arithmetic mean ± standard deviation [lower extreme, upper extreme].

	<i>B. corsicus</i> (n=45, i=85)	<i>B. communis</i> (n=60, i=119)	<i>B. meridionalis</i> (n=5, i=10)	<i>B. atlantis</i> (n=5, i=10)	<i>B. syrius</i> (n=2, i=4)	<i>B. breviceps</i> (n=1, i=3)	<i>B. cucullus</i> (n=2, i=3)	<i>B. pubens</i> (n=1, i=3)	<i>B. regicidus</i> (n=1)	<i>B. paradoxus</i> (n=1, i=1)	<i>B. enigmaticus</i> (n=1, i=11)	<i>C. wroughtoni</i> (n=1, i=1)	<i>A. AU01</i> (n=3, i=3)
CS [µm]	614 ± 19 [563, 655]	616 ± 23 [565, 672]	617 ± 7 [607, 626]	589 ± 30 [548, 628]	622 ± 21 [607, 637]	631	605 ± 12 [596, 613]	600	620	567	531 ± 7 [520, 542]	616	553 ± 11 [545, 566]
CL / CW	1.106 ± 0.016 [1.074, 1.140]	1.121 ± 0.022 [1.063, 1.164]	1.158 ± 0.015 [1.136, 1.176]	1.110 ± 0.028 [1.069, 1.147]	1.093 ± 0.027 [1.073, 1.112]	1.072	1.168 ± 0.017 [1.156, 1.181]	1.106	1.102	1.079	1.090 ± 0.014 [1.069, 1.108]	1.033	1.116 ± 0.040 [1.082, 1.160]
PoOc / CL	0.444 ± 0.007 [0.428, 0.461]	0.445 ± 0.009 [0.421, 0.465]	0.470 ± 0.002 [0.467, 0.472]	0.479 ± 0.005 [0.472, 0.485]	0.456 ± 0.002 [0.455, 0.458]	0.461	0.466 ± 0.014 [0.456, 0.476]	0.464	0.478	0.493	0.470 ± 0.009 [0.456, 0.490]	0.486	0.542 ± 0.012 [0.529, 0.549]
ClyW / CS	0.758 ± 0.009 [0.736, 0.771]	0.800 ± 0.010 [0.773, 0.820]	0.816 ± 0.011 [0.803, 0.826]	0.814 ± 0.008 [0.806, 0.826]	0.810 ± 0.005 [0.806, 0.813]	0.849	0.801 ± 0.004 [0.798, 0.804]	0.817	0.786	0.751	0.743 ± 0.023 [0.702, 0.777]	0.805	0.737 ± 0.018 [0.723, 0.757]
dAn / CS	0.329 ± 0.007 [0.314, 0.342]	0.345 ± 0.008 [0.332, 0.366]	0.329 ± 0.010 [0.321, 0.345]	0.343 ± 0.003 [0.340, 0.348]	0.339 ± 0.005 [0.336, 0.343]	0.340	0.335 ± 0.001 [0.334, 0.336]	0.333	0.335	0.298	0.370 ± 0.016 [0.348, 0.402]	0.351	0.326 ± 0.006 [0.320, 0.331]
EYE / CS	0.172 ± 0.006 [0.162, 0.186]	0.158 ± 0.008 [0.144, 0.179]	0.138 ± 0.005 [0.134, 0.146]	0.118 ± 0.007 [0.109, 0.128]	0.137 ± 0.000 [0.137, 0.137]	0.131	0.144 ± 0.003 [0.142, 0.146]	0.136	0.148	0.189	0.223 ± 0.004 [0.214, 0.229]	0.175	0.122 ± 0.005 [0.117, 0.126]
SL / CS	0.895 ± 0.012 [0.878, 0.929]	0.901 ± 0.016 [0.872, 0.950]	0.931 ± 0.013 [0.911, 0.941]	0.852 ± 0.017 [0.824, 0.867]	0.900 ± 0.014 [0.890, 0.910]	0.870	0.891 ± 0.003 [0.889, 0.894]	0.871	0.896	0.748	0.798 ± 0.013 [0.777, 0.821]	0.763	0.728 ± 0.034 [0.707, 0.767]
F2 / CS	0.155 ± 0.005 [0.143, 0.165]	0.167 ± 0.005 [0.156, 0.176]	0.178 ± 0.007 [0.167, 0.184]	0.154 ± 0.006 [0.147, 0.160]	0.151 ± 0.008 [0.145, 0.157]	0.154	0.170 ± 0.004 [0.167, 0.173]	0.159	0.156	0.117	0.136 ± 0.007 [0.121, 0.144]	0.115	0.090 ± 0.002 [0.088, 0.091]
IF2	1.499 ± 0.070 [1.346, 1.703]	1.586 ± 0.076 [1.394, 1.767]	1.666 ± 0.067 [1.576, 1.730]	1.383 ± 0.062 [1.296, 1.461]	1.475 ± 0.096 [1.407, 1.542]	1.438	1.576 ± 0.080 [1.519, 1.633]	1.452	1.493	1.048	1.117 ± 0.071 [1.000, 1.222]	1.109	0.876 ± 0.091 [0.814, 0.981]
MW / CS	0.657 ± 0.013 [0.622, 0.678]	0.656 ± 0.018 [0.617, 0.703]	0.668 ± 0.014 [0.645, 0.678]	0.670 ± 0.016 [0.656, 0.698]	0.666 ± 0.012 [0.658, 0.675]	0.682	0.658 ± 0.004 [0.655, 0.661]	0.676	0.664	0.623	0.645 ± 0.014 [0.612, 0.665]	0.680	0.628 ± 0.003 [0.624, 0.630]
PrL / CS	0.555 ± 0.019 [0.498, 0.589]	0.568 ± 0.017 [0.513, 0.599]	0.611 ± 0.014 [0.592, 0.625]	0.581 ± 0.010 [0.568, 0.595]	0.550 ± 0.011 [0.542, 0.557]	0.616	0.568 ± 0.014 [0.558, 0.578]	0.593	0.593	0.468	0.531 ± 0.022 [0.492, 0.557]	0.552	0.513 ± 0.016 [0.499, 0.531]
MGr / CS	0.031 ± 0.0048 [0.021, 0.041]	0.0183 ± 0.0053 [0.0036, 0.0328]	0.0063 ± 0.0043 [0.000, 0.0114]	0.0089 ± 0.0016 [0.006, 0.010]	0.0123 ± 0.0024 [0.0106, 0.0139]	0.000	0.0025 ± 0.0026 [0.001, 0.004]	0.0016	0.0018	0.04	0.0447 ± 0.0061 [0.0353, 0.0566]	0.06	0.0313 ± 0.0069 [0.0237, 0.0371]

*Arnoldius* (Dubovikoff, 2005) AU01

AUSTRALIA: 1 worker, Queensland, Smithfield Conservation Park 16.8167° S, 145.6833° E, 70 m, 9 Mar. 2006, rainforest, sifted litter (leaf mold, rotten wood), A. Lucky #ALC339-1 [UCDC: CASENT0106155]; 1 worker, New South Wales, Kanangra, Boyd National Park, 33°59' S, 150°07' E, 1050 m, 19 Jul. 1975, dry sclerophyll forest, under stone, P.S. Ward #PSW1000 [UCDC]; 1 worker, Queensland, Smithfield Conservation Park, 16°49' S, 145°41' E, 70 m, 17 Aug. 2006, rainforest, ex. rotten log, P.S. Ward #PSW15681 [UCDC].

In Table 2 we compare *B. enigmaticus* sp. nov., *B. paradoxus*, *Chronoxenus wroughtoni* and an undescribed species of *Arnoldius* to data collected from a morphometric study of Palearctic *Bothriomyrmex* conducted by Seifert (2012). In this context, some very general observations can be made about the morphological affinities of *B. enigmaticus* sp. nov.: the eyes of *B. enigmaticus* sp. nov., relative to cephalic size are the largest in this dataset, similar to the large-eyed *B. paradoxus*, *C. wroughtoni*, and *B. corsicus*. The antennal scapes are short as well, a feature shared by *B. paradoxus*, *C. wroughtoni* and *A. AU01*. Finally, the propodeum is compact and delineated by a deep metanotal groove, much like *B. paradoxus*, *C. wroughtoni*, *A. AU01*, and to a lesser degree *B. corsicus*.

## Discussion

This is the first record of *Bothriomyrmex* from the Caribbean region, and the second species to be described from the Americas. Until very recently, this genus was considered to be limited strictly to the Palearctic region. An estimation of the phylogeny, biogeography and divergence times of the Dolichoderinae (Ward *et al.* 2010) suggested that the split between *B. paradoxus* and the Palearctic species, *B. saundersi* (Santschi, 1922), occurred between 5 and 15 mya, excluding a simple explanation of vicariance by continental drift. One hypothesis that could reconcile the current distribution and phylogeny of this group is that characters such as short antennal scapes, compact propodeum and deep metanotal groove are plesiomorphic to (*Bothriomyrmex* + *Chronoxenus* + *Arnoldius*), while having large eyes is a trait that is plesiomorphic to (*Chronoxenus* + *Bothriomyrmex*), which have subsequently become reduced in some species. If this is the case, the most plausible explanation for the current distribution is that *Bothriomyrmex* was once much more broadly distributed in the Americas, and went extinct in the Nearctic part of its range in recent times.

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