

New records of myrmicine ants (Hymenoptera: Formicidae) for Colombia

Nuevos registros de hormigas Myrmicinae (Hymenoptera: Formicidae) para Colombia

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Abstract: Colombia is a country with a high diversity of ants; however, several new taxa are still being reported for the country. Forty seven new records for the country are registered here, all in the subfamily Myrmicinae: one new species record for the genera *Adelomyrmex*, *Allomerus*, *Kempfidris*, *Megalomyrmex*, *Octostruma* and *Tranopelta*; two for *Rogeria*; five for *Myrmicocrypta*; six for *Procryptocerus*; seven for *Cephalotes*; ten for *Pheidole* and eleven for *Strumigenys*. Three of these new records are invasive or tramp species, *Pheidole indica*, *Strumigenys emmae*, and *Strumigenys membranifera*. Three species are also recorded for the first time in South America: *Pheidole sicaria*, *Procryptocerus tortuguero*, and *Strumigenys manis*. The ant genus *Kempfidris* is recorded for the first time for Colombia. All species are commented. Currently, the diversity of ants in Colombia approaches 1,200 known species in 105 genera.

Key words: Amazon rainforest, Andean region, biodiversity, Colombian fauna, Formicidae, Neotropical region, tramp species.

Resumen: Colombia es un país con alta diversidad de hormigas, sin embargo, nuevos taxones se siguen registrando para el país. Cuarenta y siete nuevos registros se relacionan aquí, todos dentro de la subfamilia Myrmicinae: Uno para los géneros *Adelomyrmex*, *Allomerus*, *Kempfidris*, *Megalomyrmex*, *Octostruma* y *Tranopelta*; dos para *Rogeria*; cinco para *Myrmicocrypta*; seis para *Procryptocerus*; siete para *Cephalotes*; diez para *Pheidole* y once para *Strumigenys*. Tres de esos nuevos registros corresponden a especies invasoras, *Pheidole indica*, *Strumigenys emmae* y *Strumigenys membranifera*. Tres especies se citan por primera vez para América del Sur: *Pheidole sicaria*, *Procryptocerus tortuguero* y *Strumigenys manis*. El género *Kempfidris* se registra por primera vez para Colombia. Se ofrecen comentarios para todas las especies. La diversidad de hormigas en Colombia comprende 105 géneros y casi 1.200 especies.

Palabras clave: Amazonas, Andes, biodiversidad, fauna de Colombia, Formicidae, Neotrópico, especies invasoras.

Introduction

Colombia, located in the northwestern region of South America, is considered to be one of the most biologically diverse countries in the planet, surpassed only by Brazil (Chaves and Arango 1998; Poveda *et al.* 2011; Sánchez-Cuervo *et al.* 2012; Butler 2016). In addition to the Amazon Basin, two areas considered biodiversity hotspots for conservation planning (i.e., areas that present high concentration of endemic species and are highly threatened by human activities) are included within Colombian territory, namely, the species-rich Andean and the Chocó-Darien hotspots (Mittermeier *et al.* 1998; Myers *et al.* 2000; Brooks

et al. 2002; Dávalos *et al.* 2011). Furthermore, Colombia has strengthened its biodiversity conservation strategy throughout a vast network of 56 protected areas encompassing ~15% of the country territory, thus reducing the possibility of deforestation (Armenteras *et al.* 2003; Dávalos *et al.* 2011; Sánchez-Cuervo *et al.* 2012).

Among other animal groups and plants (see Butler 2016), ants are a diverse group in Colombia, which includes ~1,100 ant species (included in 104 ant genera), in contrast to the 3,300 species (included in 129 genera) currently known for the Neotropical region. In order to contribute to the study of ants in the country, we report 47 new species records for Colombia, in the hope that this motivates new

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collecting efforts by national and international collaborators, especially in areas that have been prohibited in the past due to Colombia's armed conflict.

Materials and methods

Specimens. The specimens examined and listed here are deposited in the insect collections of the following institutions:

ICN, Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, D.C., Colombia.

UNAB, Museo de Entomología, Facultad de Agronomía, Universidad Nacional de Colombia, Bogotá, D.C., Colombia.

IAvH-E, Alexander von Humboldt Institution, Villa de Leyva, Boyacá, Colombia.

LACM, Los Angeles County Museum, CA, USA.

MPUJ, Museo Javeriano de Historia Natural, Pontificia Universidad Javeriana, Bogotá, D.C., Colombia.

USNM, United States National Museum of Natural History, Smithsonian Institution, Washington D.C., USA.

Morphological terms and taxonomic identification.

Morphological analysis follows Bolton *et al.* (2003) and de Andrade and Baroni Urbani (1999). Pronotal index is defined as HW/PW, where Head Width (HW), in full-face view, is defined as the maximum width of the cephalic capsule, while Pronotal Width (PW) is defined as maximum pronotum width in dorsal view including the propodeal spines, apodemes, and lamellae if present.

Specific taxonomic revisions were used to identify the species, but in some cases comparisons were made with specimens previously identified in USNM, or the original descriptions of the taxa were used. The following keys or taxonomic descriptions were used in the identification of species: Brandão (1990) for *Megalomyrmex*; de Andrade and Baroni Urbani (1999) for *Cephalotes*; Longino (2012) for *Adelomyrmex*; Fernández (2007) and Fernández *et al.* (2014) for *Kempffidris*; Sosa-Calvo (2015) for *Myrmicocrypta*; Longino (2013b) for *Octostruma*; Wilson (2003) and Longino (2009) for *Pheidole*; Serna-Cardona (2009) for *Procryptocerus*; LaPolla and Sosa-Calvo (2006) for *Rogeria*; Bolton (2000) for *Strumigenys*; Fernández (2003a) for *Tranopelta*.

Specimen information and distribution maps. The information associated with each specimen was transcribed

from the accompanying labels. In most cases, the geographic coordinates were extracted from those labels; however, some specimens only recorded localities whose geographical coordinates were inferred using Global Gazetteer Version 2.3 (Falling Rain Software, Ltd. 2017). The distribution maps were created using QGIS v2.14 (Quantum GIS Development Team 2016) in the WGS84 coordinate system.

Color images. Digital images of Figures 3-4, 8G-8H and 9E-9F, were generated with a Leica digital high resolution camera (Type DFC450), attached to a Leica M205FA automated stereomicroscope. Stacked images were processed with LAS montage module-Leica®. Other digital images were taken from AntWeb (2017). Saturation and brightness were adjusted in Corel PHOTO PAINT X8, and the plates were assembled with Corel DRAW X8.

Results

Subfamily Myrmicinae

Adelomyrmex striatus Fernández, 2003

Figs. 1A-1B, 2A

Material examined. COLOMBIA. Amazonas. Amacayacu National Park. 3°48'37.08"S 70°15'58.319"W. 88 m. Forest, rotten wood. Winkler sample. 7-Oct-2007. Schultz, T.R. and Johnson, S. (TRS071007-WS03) [1 worker. USNM].

Taxonomic identification. This species is easily distinguished by the presence of sharp spiniform teeth on the median clypeal lobe and regular longitudinal striate sculpture on the head, pronotum, mesonotum, sides of mesosoma, and petiole. The Colombian specimen presents yellowish, long and flexuous hairs on the body, but relatively shorter than in the phenotype of Manaus (Amazonas, Brazil) populations.

Comments. Previously known from Brazil, Ecuador, and Peru (Fernández 2003b; Fernández and Sendoya 2004; Longino 2012; Bezděčková *et al.* 2015; Salazar *et al.* 2015). This species is recorded from the Amazonian rainforest (Amazonas).

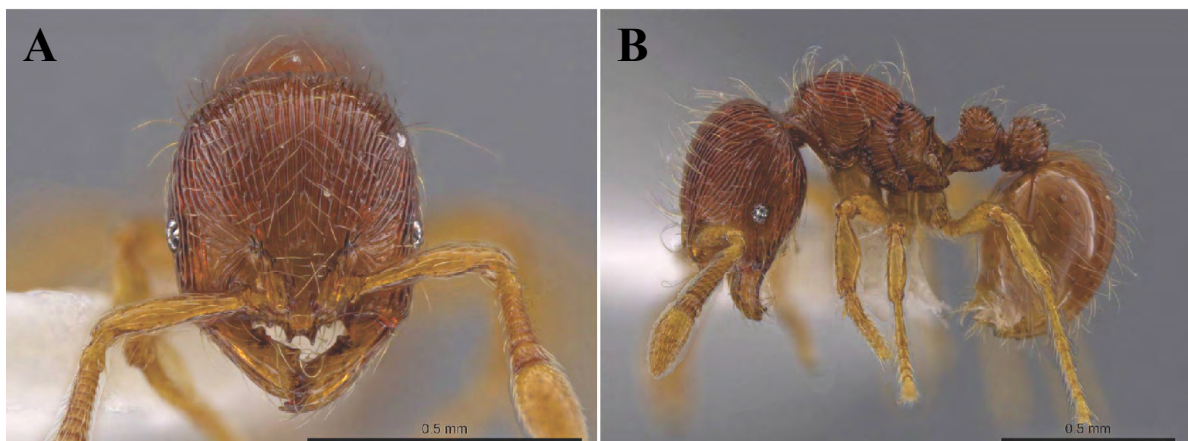


Figure 1. High-resolution images of the head in full-face view (A) and body profile (B) of the *Adelomyrmex striatus* worker. (CASENT0629013. Image by John T. Longino, from www.antweb.org).

Allomerus dentatus Fernández, 2007

Fig. 2A

Material examined. COLOMBIA. Vaupés. Pacoa. From Buenos Aires to Villareal village. 00°01'21.3"N 71°00'09.4"W. 180m. Terra firme forest. Collected in *Maieta*

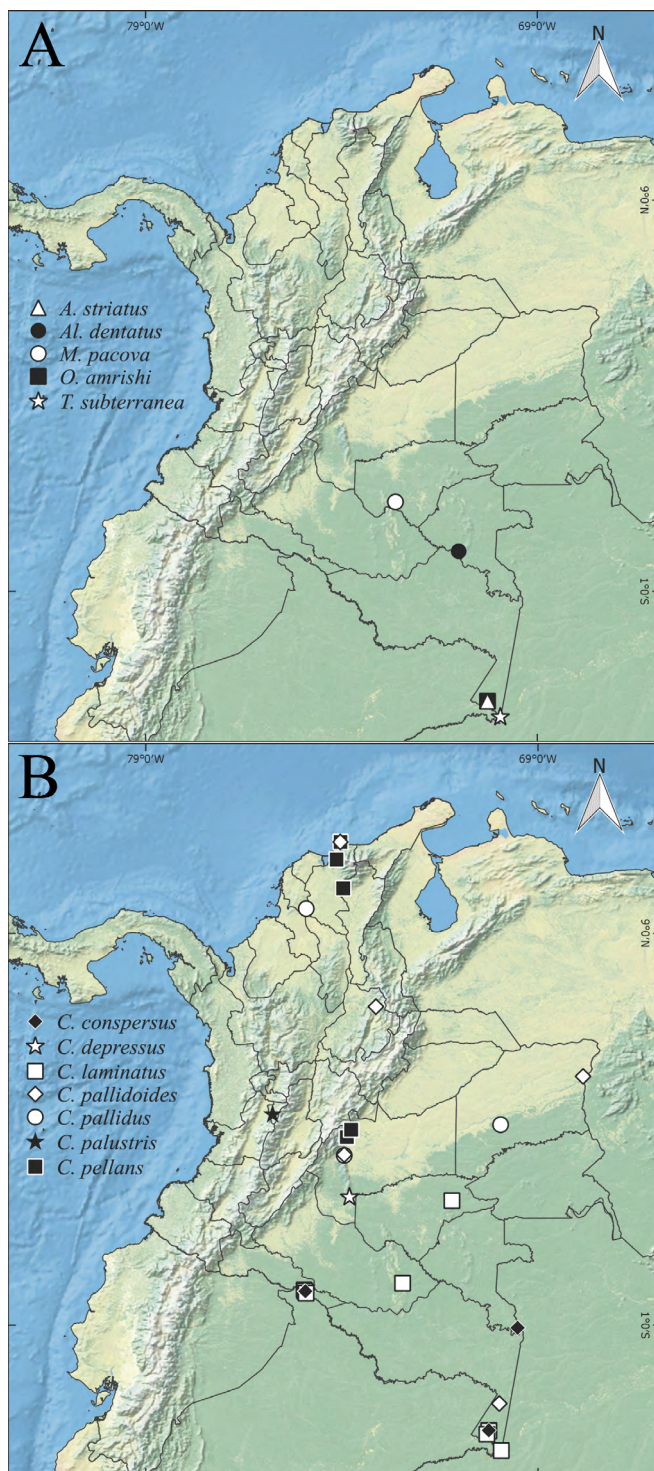


Figure 2. Distribution map of: A. *Adelomyrmex striatus*, *Allomerus dentatus*, *Megalomyrmex pacova*, *Octostruma amrishi* and *Tranopelta subterranea*. B. *Cephalotes* species new records for Colombia.

Aublet, 1775 (Melastomataceae). 1-Mar-2018. Betancur, J. [1 worker. ICN].

Taxonomic identification. This species is easily distinguished by the presence of propodeal spines and larger propodeal spiracle, located close to propodeal tooth base.

Comments. Previously known from Amazonas, Venezuela (Fernández 2007a), collected in *Tococa hirta* O. Berg ex Triana, 1871. This is the first record for Colombia and the second for the species.

Cephalotes conspersus (F. Smith, 1867)

Figs. 2B, 3A-3B

Material examined. COLOMBIA. Amazonas. Parque Nacional Natural Amacayacu. Matamata. 3°40'60"S 70°15'W. 150 m. 12-Mar-2-Apr-2001. Chota, D. (m.1608) [1 worker. IAvH-69018]; Amazonas. Parque Nacional Natural Amacayacu. Mocagua. Malaise trap. 16-Apr-7-May-2001. Parente, A. (M.1865) [1 worker. IAvH-68956]; Amazonas. Parque Nacional Natural Amacayacu. Centro de Visitantes "Yewae". Malaise trap. 1-10-Mar-2004. Pape, T. and Arias, D. (m.4324) [2 workers. IAvH-68958, IAvH-68959]. Putumayo. Parque Nacional Natural La Paya. Finca Charapa. 0°7'59.88"S 74°57'W. 330 m. Malaise trap. 22-26-Sep-2001. Campos, D. (m.2076) [1 worker. IAvH-69318]; Putumayo. Parque Nacional Natural La Paya. Cabaña La Paya Chagra. 0°7'59.88"S 74°55'59.88"W. 320 m. Malaise trap. 30-Mar-15-Apr-2002. Cobete, R. (m.3149) [1 worker. IAvH-69267]. Vaupés. Estación Biológica Mosiro-Itajura (Caparú). Centro Ambiental. 1°4'0.12"S 69°31'0.12". 60 m. Malaise trap. 20-Jan-1-Feb-2003. Sharkey, M. and Arias, D. (m.3386) [1 worker. IAvH-69380].

Taxonomic identification. This species can be differentiated by the bicolored first gastral tergite, with a black, rhombus-shaped spot in the central disc, and ferruginous to light brown on the rest of tergite surface.

Comments. Previously known from Bolivia, Brazil (Smith 1867; de Andrade and Baroni Urbani 1999; Fernández and Sendoya 2004), and Venezuela (Salinas 2010). *Cephalotes conspersus* is distributed in the Colombian Amazon rainforest. Janicki *et al.* (2016) recorded *Cephalotes conspersus* in Colombia based on Fernández *et al.* (1996), but de Andrade and Baroni Urbani (1999) considered that this record corresponds to *C. palta*, a very similar species, particularly in the soldier caste. V.E Sandoval, one of the authors of the present work, studied the *Cephalotes* in Colombia and could not find the specimens referred by Fernández *et al.* (1996). Since Janicki *et al.* (2016) did not offer complete information to validate this species record for Colombia, the specimens recorded in Amazonas, Putumayo, and Vaupés, herein, correspond to the first record of *C. conspersus* in Colombia.

Cephalotes depressus (Klug, 1824)

Figs. 2B, 3C-3D

Material examined. COLOMBIA. Meta. Parque Nacional Natural Tinigua. Bajo Rudal. 2°16'0.12"N 73°47'60"W. 460

m. Entomological net. 21-Dec-2001. Campos, D. (m.2626) [2 workers. IAvH-69186, 69183].

Taxonomic identification. *Cephalotes depressus* workers can be differentiated by the smooth vertex without protuberances or denticles, dorsum of the propodeum largely covered by hairs, and anterolateral border of the first tergite crested. The specimens examined here differ from the other *depressus* specimens for having the inner tooth of the occipital lobes more projected upward.

Comments. Previously known from Argentina, Bolivia, Brazil, Ecuador, Guyana, Paraguay, and Venezuela (Klug 1824; de Andrade and Baroni Urbani 1999; Fernández and Sendoya 2004). In Colombia, *Cephalotes depressus* is known only of populations inhabiting the Amazonian piedmont of the Parque Nacional Natural Tinigua (Meta).

***Cephalotes laminatus* (F. Smith, 1860)**

Figs. 2B, 3E-3F

Material examined. COLOMBIA. Amazonas. Leticia. Comunidad Indígena Monifue Amana. 4°12'S 69°56'W. 70 m. Manual. 30-Sep-2004. (A. Torres) [1 worker. MPUJ]; Amazonas. Parque Nacional Natural Amacayacu. Matamata. 3°40'59.88"S 70°15'0"W. 150 m. Entomological net. 8-Jul-2000. Parente, A. (m.3546) [1 worker. IAvH-68955]; Amazonas. Parque Nacional Natural Amacayacu. Matamata. 3°42'0"S 70°15'0" W. 150 m. Malaise. 25-Aug-3-sep 2001, 17-Sep-1-Oct-2001. Chota, D. (m.2242, m.2245, m.2248, m.2768) [9 workers, 1 gyne. IAvH-68963, 69015, 68890, 68880, 68985, 68986]; Amazonas. Parque Nacional Natural Amacayacu. San Martín. 3°46'59.88"S 70°17'60"W. Malaise. 3-11-Nov-2000, 2-15-Oct-2001, 5-Dec-2001. Amado, B (m.1313). Chota, D. (m.2246, m.2762) [2

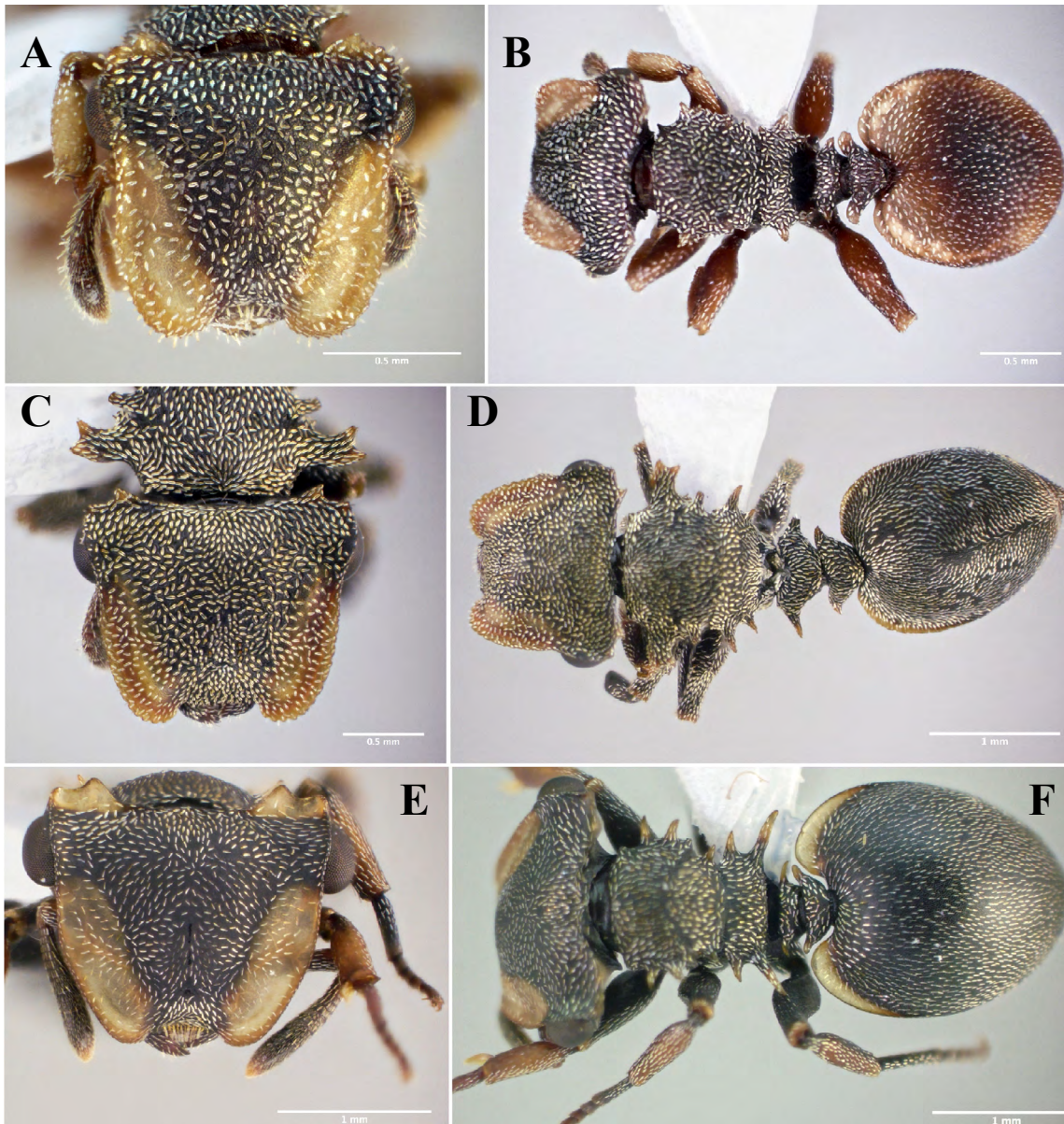


Figure 3. High-resolution images of the head in full-face view and body dorsal view of the *Cephalotes* worker. **A-B.** *Cephalotes conspersus*; **C-D.** *Cephalotes depressus*. **E-F.** *Cephalotes laminatus*. All images by Vivian Sandoval and Andrés Sánchez.

workers, 1 soldier, 1 gyne. IAvH-68931, IAvH-68960, 68978, 68904, 69028]. Caquetá. Parque Nacional Natural Serranía de Chiribiquete. Puerto Abeja. 0°4'15.996"N 72°26'48.12"W. 310 m. Malaise trap. Bosque coluvial. 14-23-Jan-2000. Arenas, C. [1 worker. IAvH-64307]. Guaviare. Reserva Nacional Natural Nukak. Caño Cucuy. Camino al puerto río Inirida. 2°10'41.16"N 71°11'25.08" W. 250 m. 1-Feb-1996, 3-Feb-1996. Fernández, F. [3 worker. IAvH-64348, 64349, 64350]. Putumayo. Parque Nacional Natural La Paya. Bocana Mamansoya. 0°6'0"S 74°58'0.12"W. Manual. 20-Sep-2001. Campos, D. (m.2812) [1 worker. IAvH-69223]; Putumayo. Parque Nacional Natural La Paya. Finca Charapa. 0°7'59.88"S 74°57'0"W. Malaise trap. 28-Apr-2002. Cobete, R. (m.3243) [1 worker. IAvH-69251]; Putumayo. Parque Nacional Natural La Paya. Resguardo Cecilio Cocha. 0°10'59.988"S 74°55'0.12"W. 330 m. Malaise trap. 20-24-Jan-2003. Sarmiento, C. (m.3418, m.3419, m.3420) [1 soldier, 2 workers. IAvH-69264, 69299, 69391].

Taxonomic identification. This species is distinguishable from the other species of the *laminatus* clade (de Andrade and Baroni Urbani 1999) recorded in Colombia by the pronotal and propodeal spines longer and thinner in the worker caste. Besides, *C. laminatus* workers present the anterolateral border of the first gastral tergite largely dilated anterad.

Comments. Previously known from Brazil, Ecuador, and Peru (Smith 1860; de Andrade and Baroni Urbani 1999; Fernández and Sendoya 2004; Salazar *et al.* 2015; Wilkie *et al.* 2009; Sandoval and González 2007). This species is recorded in secondary and primary forest from the Amazonia region in Colombia (Amazonas, Caquetá, Guaviare, and Putumayo).

Janicki *et al.* (2016) recorded this species in Magdalena (North of Colombia) based on Kempf (1959), however, the latter author recorded the subspecies *C. laminatus christopherseni* Forel, 1912, which posteriorly was raised to the species level by Kempf (1972). Based on this taxonomic change, the species recorded in Magdalena is *C. christopherseni*, thus, the records from the Amazonia region correspond to the first record of *C. laminatus* for Colombia.

Cephalotes pallidoides de Andrade, 1999

Figs. 2B, 4A-4B

Material examined. COLOMBIA. Amazonas. Leticia. Parque Nacional Natural Amacayacu. Cabaña Lorena. 3°0'0"S 69°58'59.88"W. Entomological net. 27-Aug-2001. Campos, D. (m.2234) [1 worker. IAvH-68949]; Amazonas. Leticia. Parque Nacional Natural Amacayacu. Centro de Visitantes "Yewae". Malaise trap. 1. mar.2004. Pape, T. and Arias, D. (m.4324) [2 workers. IAvH-68922, 68909]; Amazonas. Leticia. Parque Nacional Natural Amacayacu. San Martín. 3°46'0.12"S 70°17'60"W. Malaise trap. 3-Dec-2001. Chota, D. (m.2773) [1 worker. IAvH-68997]. Magdalena. Parque Nacional Natural Tayrona. Cañaverl. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 22 Nov-4 Dec 2000. Henríquez, R. (m.939) [1 worker. IAvH-64412]. Meta. Parque Nacional Natural Sierra de La Macarena. Caño la Curia. 3°21'0"N 73°55'59.88"W. 460 m. Malaise trap. 10-Nov-21-

dec 2002, 24-Feb-10-Mar-2003. Duarte, M. (m.2979), W. Villalba (m.3525) [1 soldier, 1 worker. IAvH-69142, IAvH-69166]. Santander. Bucaramanga. Universidad Industrial de Santander. 7°7'46.92"N 73°7'32.88"W. 960 m. 1-Jun-2003. Ruiz, N. and Fernández, J. [1 worker. ICN-MHN]. Vichada. Parque Nacional Natural El Tuparro. 5°20'60"N 67°50'60"W. 1000 m. Malaise trap. 15-19-jun.2000. Sharkey, M. and Sarmiento, C. (m.3582) [2 soldiers, 4 workers. IAvH-69479, 69420, 69431, 69419, 69472, 69467].

Taxonomic identification. This species is easily distinguished by the femora more inflates than other species of the *pallens* clade in Colombia (*C. pallidus* and *C. pellans*); this feature is uniform between workers and soldiers.

Comments. Previously known from Brazil, Bolivia, French Guiana, Guyana, Panama, Paraguay, Peru, Trinidad, and Venezuela (de Andrade and Baroni Urbani 1999; Fernández and Sendoya 2004). In Colombia, this species is distributed in forest habitats with some populations in humid forest in the Amazon region (Amazonas, Meta, and Vichada) and dry forest to the north of the country, although records exist in urban areas, in the city of Bucaramanga (Santander) to the east of Colombia.

The project "Insect Survey of a Megadiverse Country: Colombia" (Sharkey 2006) records *Cephalotes pallilloides* in the National Park Tayrona (Magdalena), but the specific epithet "pallilloides" is a misspelling of *pallidoides*. We suggest that this record refers to the species *C. pallidoides*, because the recorded information in the database matches the information of the specimen IAvH-64412 (see material examined).

Cephalotes pallidus de Andrade, 1999

Figs. 2B, 4C-4D

Material examined. COLOMBIA. Amazonas. Leticia. Via Tarapacá, Km 11. 4°7'0.12"N 69°57'0"W. 200 m. Malaise trap. 22-Feb-7-Mar-2003. Morales, W. (m.3778) [1 worker. IAvH-69088]. Bolívar. Zambrano. Hacienda Monterrey. Tropical dry forest. 9°37'48"N 74°54'43.92"W. 50 m. 1-Oct-1993. Molano, A. [1 soldier, 1 worker. ICN-MHN HY-1757]. Meta. Parque Nacional Natural Sierra de La Macarena. Río Guejar. 3°19'59.88"N 73°55'59.88"W. 460 m. Malaise trap. 28-Dec-3-Jan-2002. Campos, D. (m.2625) [1 worker. IAvH-69145].

Taxonomic identification. This species can be confused with *C. pallidoides*, but in *C. pallidus* worker and soldier the body sculpture is deeper and femora less inflates; in addition, vertex slightly crested while in the other species relatively smooth.

Comments. Previously known from Ecuador, Venezuela, Trinidad, Guyana, Suriname, French Guiana, Brazil, Peru, and Bolivia (de Andrade and Baroni Urbani 1999; Fernández and Sendoya 2004; Groc *et al.* 2017; Salazar *et al.* 2015).

Cephalotes palustris de Andrade, 1999

Figs. 2B, 4E-4F

Material examined. COLOMBIA. Quindío. Buenavista. Vda. El Infierno. Finca Guadalajara. 4°22'36.12"N 75°46'9.84"W. 1160 m. Manual. 17-Nov-1999. González, E. [1 worker. IAvH-64436].

Taxonomic identification. This specimen can be confused with *Cephalotes cordatus* workers, but it differs by the vertex with two truncate lamellas in each corner, and pronotal index (HW/PW) ≤ 0.97 (de Andrade and Baroni Urbani 1999).

Comments. Previously known from Guyana and Brazil (de Andrade and Baroni Urbani 1999; Fernández and Sendoya 2004). In Colombia, this species is recorded for the coffee producing area of the country (Quindío).

Cephalotes pellans de Andrade, 1999

Figs. 2B, 4G-4H

Material examined. COLOMBIA. Cesar. El Copey. Finca La Joya. Manual. Frog stomach content, oil palm crop. 22-Feb-2007. Blanco, A. (m.1023C) [2 workers. UATL]. Magdalena. Ciénaga. Corr. Riofrío, 5 Km SE. 10°52'59.88"N 74°7'59.88"W. 100 m. Tropical dry forest. 16-Aug-1985. Ward, P.S. (m.7959) [2 workers. ICN-MHN];

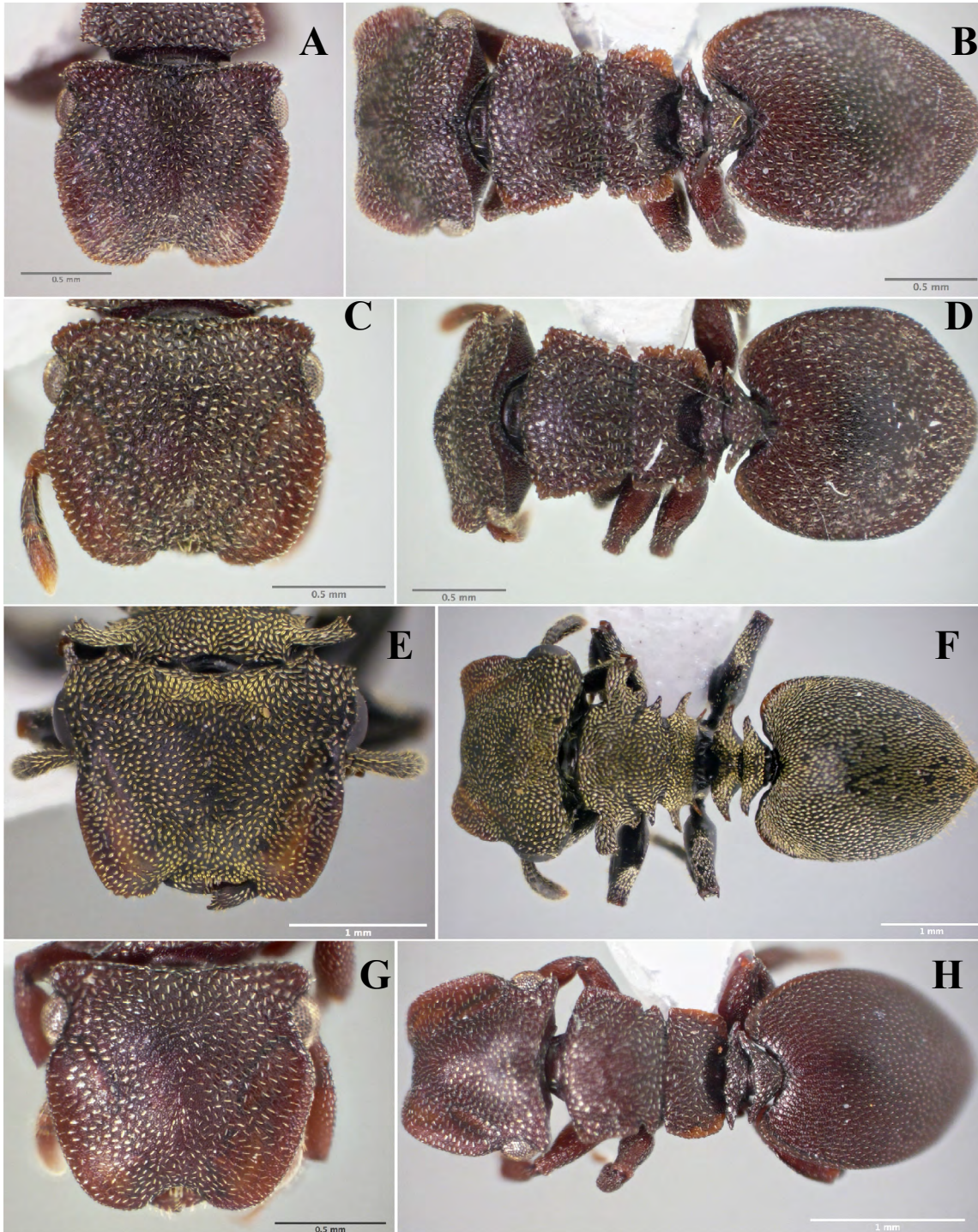


Figure 4. High-resolution images of the head in full-face view and body dorsal view of the *Cephalotes* worker. A-B. *Cephalotes pallidoides*. C-D. *Cephalotes pallidus*. E-F. *Cephalotes palustris*. G-H. *Cephalotes pellans*.

Magdalena. Parque Nacional Natural Tayrona. Gayraca. 11°19'58.8"N. 74°1'59.88"W. 30 m. 16-Mar-1978. Kugler, C. [3 queens, 1 male, 4 soldiers, 4 workers. IAvH-64369, 64370, 64372, 64373, 64371]; Magdalena. Parque Nacional Natural Tayrona. Gayraca. Abanico aluvial. 11°19'58.8"N. 74°1'59.88"W. 30m. 4-Sep-1977. Kugler, C. [2 workers. IAvH]; Magdalena. Parque Nacional Natural Tayrona. Gayraca. 11°19'58.8"N. 74°1'59.88"W. 30 m. 21-Feb-5, Mar-2001. Malaise trap. Henriquez, R. (m.1350, m.1479) [6 workers, 1 queen. IAvH-64414, 69654, 69732, 69817, 69814, 69820]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 2-Feb-5-Mar-2001. Henriquez, R. (m.1351, m.1482) [1 worker, 1 queen. IAvH-69526, 69581, 69522]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 5-20-Apr-2001 Henriquez, R. (m.1597) [3 workers. IAvH-69656, 69725, 69730]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 23-May-10-Jun-2001 Henriquez, R. (m.1762) [1 worker. IAvH-69468]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 23-Jun-1-Jul-2001. Henriquez, R. (m.1926) [1 soldier. IAvH-69713]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88" W. 30 m. Malaise trap. 28-Jul-18-Aug-2001. Henriquez, R. (m.2019) [1 worker. IAvH-69708]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 17-27-Sep-2001. Henriquez, R. (m.2136) [1 worker. IAvH-69483]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 18-31-Oct-2001. Henriquez, R. (m.2230) [2 workers. IAvH-69495, 69400]; Magdalena. Parque Nacional Natural Tayrona. Neguange. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 31-Oct-15-Nov-2001. Henriquez, R. (m.2569) [3 workers. IAvH-69830, 69875, 69840]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W 30 m. Malaise trap. 21-Jan-5-Feb-2001. Henriquez, R. (m.1352) [3 workers. IAvH-64413, 69586]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 5-21-Mar-2001. Henriquez, R. (m.1483) [1 queen, 1 worker. IAvH-69691, 69630]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 21-Mar-5-Apr-2001. Henriquez, R. (m.1484) [2 workers. IAvH-69532, 69594]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88" W. 30 m. Malaise trap. 21-Mar-5-Apr-2001. Henriquez, R. (m.1598) [1 worker, IAvH-69645]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 23-May-10-Jun-2001. Henriquez, R. (m.1763) [3 workers. IAvH-69422, 69454, 69590]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 23-Jun-1-Jul-2001. Henriquez, R. (m.1925) [1 soldier, 4 workers. IAvH-69640, 69670, 69675, 69811, 69836]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 14-28-Jul-2001. Henriquez, R. (m.2017) [1 soldier. IAvH-69418]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'59.88"N 74°1'59.88"W. 30 m. Malaise trap. 28-Jul-18-Aug-2001. Henriquez, R. (m.2018) [1 soldier, 2 workers. IAvH-69530, 69572, 69543]; Magdalena.

Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 18-31-Oct-2001. Henriquez, R. (m.2227) [1 soldier, 2 workers. IAvH-69774, 69789, 69877]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 17-31-Jan-2002. Henriquez, R. (m.3031) [2 workers. IAvH-69592, 69680]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 31-Jan-15-Feb-2002. Henriquez, R. (m.3032) [1 soldier, 2 workers. IAvH-69561, 69666, 69784]; Magdalena. Parque Nacional Natural Tayrona. Palangana. 11°19'58.8"N 74°1'59.88"W. 30 m. Malaise trap. 15-Feb-6 -Mar-2002. Henriquez, R. (m.3033) [1 worker. IAvH-69462]. Meta. Parque Nacional Natural Sumapaz. Cabaña las Mirlas. 3°47'60"N 73°52'0.12"W. 779 m. Malaise trap. 20-Nov-2003. Vargas, H. (m.4350) [1 worker. IAvH-69229]; Meta. Parque Nacional Natural Sumapaz. Quebrada La Cristalina. 3°47'60"N 73°52'0.12" W. 779 m. Malaise trap. 20-Aug-5-Sep-2003. Vargas, H. (m.4342) [1 worker. IAvH-69241]; Meta. Parque Nacional Natural Sumapaz. Sendero Las Mirlas. 3°47'60"N 73°52'0.12"W. 779 m. Entomological net. 27-28-Mar-2004. Arias, D. and Arias, T. (m.4337) [1 worker. IAvH-69216]; Meta. Parque Nacional Natural Sumapaz. Sendero Las Mirlas. 3°47'60"N 73°52'0.12"W. 779 m. Malaise trap. 5-19-Sep-2003. Vargas, H. (m.4344) [1 soldier, 3 workers. IAvH-69215, 69282, 69286, 69240]; Meta. Acacias. San José. 3°59'15"N 73°45'24.12"W. 660 m. 1-Dec-1985. López E. [1 queen. ICN-MHN].

Taxonomic identification. *Cephalotes pellans* workers can be differentiated by the margin of the lateral extensions of the mesosoma finely crenulate, propodeum more than two times wider than long, and propodeum with membranaceous expansions.

Comments. Previously known from Brazil, Bolivia, Colombia, and Paraguay (de Andrade and Baroni Urbani 1999; Fernández and Sendoya 2004; Janicki *et al.* 2016). Museum records suggest that *Cephalotes pellans* is an abundant species in the dry forests of the National Park Tayrona (Magdalena, Colombian Caribbean region). This species apparently also inhabits areas transformed into oil palm crops and the plains of National Park Sumapaz in Meta.

Kempfidris inusualis (Fernández, 2007)

Figs. 5A-5B, 6A

Material examined. COLOMBIA. Amazonas. Parque Nacional Natural Amacayacu. 3°48'50.04"S 70°15'45"W. 65 m. Nest series. Forest, in rotten log. 6-Oct-2007. Sosa-Calvo, J. and Schultz, T.R. (JSC071006-10) [5 workers. USNM].

Taxonomic identification. The genus and species can be distinguished of any other myrmicine ant by posteromedian portion of abdominal tergum VI and anteromedian portion of abdominal tergum VII with several minute, cylindrical micro-pegs, each bearing a hair on apex. No other known ant shares this trait.

Comments. Previously known from Brazil, Ecuador, Peru, and Venezuela (Fernández 2007b, Fernández *et al.* 2014; Salazar *et al.* 2015; Camacho and Feitosa 2016). This is the first record of this genus and its only species for Colombia,

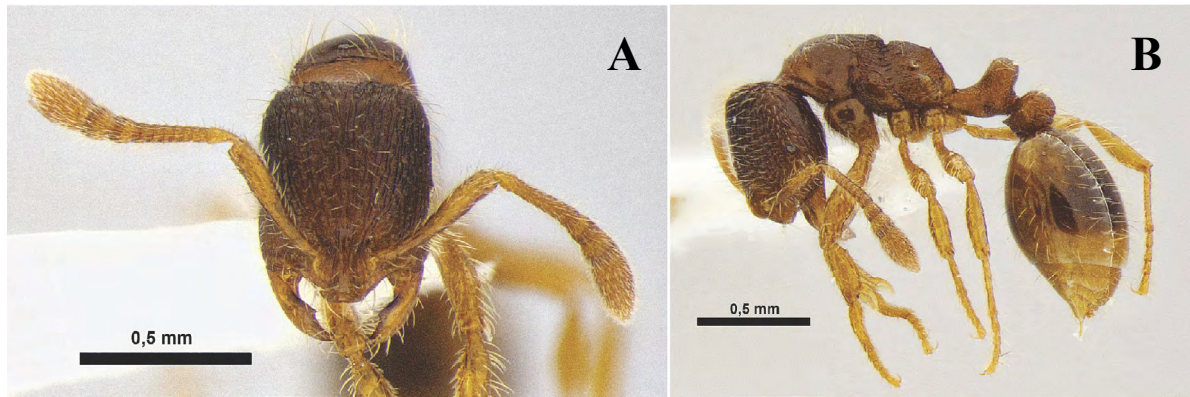


Figure 5. High-resolution images of the head in full-face view (A) and body profile (B) of the *Kempfidris inusualis* worker. (Image by Rodrigo M. Feitosa).

with populations collected within the Amazon forest in the National Park Amacayacu (Amazonas).

***Megalomyrmex pacova* Brandão, 1990**

Fig. 2A

Material examined. COLOMBIA. Vaupes. Corregimiento Pacoa. Comunidad Morroco. Cuenca río Cauauari. Cerro Morroco. 0°01'17"N 71°00'20"W. [1 worker. ICN].

Taxonomic identification. *Megalomyrmex pacova* workers can be clearly distinguished from all other *Leoninus* group species by the lack of an anterior tooth at the petiole ventral face and by the head shape.

Comments. Known from Neotropics but locality uncertain: types described from specimens intercepted in quarantine ports in Brownsville, Texas and New York (Brandão 1990).

***Myrmicocrypta boliviana* Weber, 1938**

Fig. 6A

Material examined. COLOMBIA. Guaviare. Calamar. Chiribiquete. Cerro Campana. 1°17'08.5"N 72°36'52.8"W. [1 worker. ICN].

Taxonomic identification. *Myrmicocrypta boliviana* workers can be differentiated by cephalic corners rounded, lacking tubercles; frontal carinae vestigial; frontal lobes expanded laterally, convex to triangular; clypeal median seta short; tubercles on mesosoma almost completely eroded; petiole lacking ventral process.

Comments. Known previously from Bolivia (Weber 1938).

***Myrmicocrypta ednaella* Mann, 1922**

Fig. 6A

Material examined. COLOMBIA. Cauca. Parque Nacional Natural Gorgona. El Roble. 2°57'59.76"N 78°6'36"W. 130 m. Winkler. 6-9-Mar-2001. Torres, H. (m.1494) [1 worker. IAvH]. Nariño. La Guayacana. 1°25'59.88"N 78°27'0"W. 108 m. Stomach content M3 *Dendrobates histrionicus*. Silverstone, P.A. (PAS44.66) [6 workers. LACM].

Taxonomic identification. *Myrmicocrypta ednaella* workers can be differentiated by the eyes small, 3-4 ommatidia in longest row, 10-12 ommatidia total, posterior portion of head (close to vertex) with three smaller impressions, the outer two of which are bordered by fine carinae, ventral margin of petiole with small process, hairs on tarsal segments suberect.

Comments. Known previously from Brazil, Costa Rica, Honduras, Mexico, and Panama (Mann 1922; Fernández and Sendoya 2004; Janicki *et al.* 2016; Rodríguez and Ramos 2017; Sosa-Calvo 2015). *Myrmicocrypta ednaella* is recorded from Gorgona Island in the Colombian Pacific and in lowland forests of southern Colombia (Nariño).

***Myrmicocrypta foreli* Mann, 1916**

Fig. 6A

Material examined. COLOMBIA. Putumayo. Parque Nacional Natural La Paya. Cabaña La Paya. 0°1'59.988"N 75°7'12"W. 330m. Pitfall. 1-15-Dec-2001. Lozano, E. (m.2802) [1 worker. IAvH].

Taxonomic identification. *Myrmicocrypta foreli* workers can be distinguished mainly by the frontal lobes vestigial, parallel, appearing as raised carinae, anterior pronotal tubercles vestigial, propodeal spines long, ventral margin of petiole keeled.

Comments. Previously known from Argentina, Bolivia, and Brazil (Mann 1916; Fernández and Sendoya 2004; Hanisch *et al.* 2015, Sosa-Calvo 2015).

***Myrmicocrypta occipitalis* Weber, 1938**

Fig. 6A

Material examined. COLOMBIA. Valle del Cauca. Buenaventura. Puente San Pedro. Sitio 5. 3°53'6.792"N 77°15'10.512"W. Galvis, W. [1 worker. ICN].

Taxonomic identification. *Myrmicocrypta occipitalis* workers can be differentiated by eyes small with 3-4 ommatidia in longest row; clypeal apron expanded; frontal lobes weakly expanded, convex to triangular; frontal carinae present; head rounded and posteriorly angulate; mandibles long; humeral spines long and directed horizontally; long propodeal spines.

Comments. Known previously from Bolivia (Weber 1938).

Myrmicocrypta unidentata Weber, 1937

Fig. 6A

Material examined. COLOMBIA. Cundinamarca. Tibacuy. Reserva Cerro Quinini. 4°19'56.5"N 74°29'31.8"W. 1637 m. 17-24-Oct-2015. Pitfall 4 in coffee plantation. Grupo

Artropofauna [1 worker. ICN]. Putumayo. National Park La Paya. Cabaña La Paya. Chagra. 0°7'0.12"S 74°55'59.88"W. 320 m. Winkler. 30-Apr-1-May-2002. Cobete, R. (m.3154) [2 workers. IAvH].

Taxonomic identification. *Myrmicocrypta unidentata* workers can be differentiated by the frontal carina inconspicuous; frontal lobes somewhat expanded laterally, convex; small propleuron tooth; metanotal groove deep.

Comments. Previously known from Guyana (Weber 1937; Fernández and Sendoya 2004).

Octostruma amrishi (Makhan, 2007)

Figs. 2A, 7A-7B

Material examined. COLOMBIA. Amazonas. National Park Amacayacu. 3°48'37.08"S 70°15'58.32"W. 88 m. Winkler sample, forest, leaf litter. 7-Oct-2007. Sosa-Calvo, J. and Rodriguez, J. (JSC071007-LS07) [1worker, 1 dealate queen. USNM].

Taxonomic identification. This species can be distinguished by the presence of a medial pair of spatulate setae on the posterior margin of the vertex, but lacking erect setae on posterolateral margins of head and dorsum of mesosoma which are present in other similar species such as *O. balzani* (Emery), *O. megalbalzani* Longino, and *O. trithrix* Longino (Longino 2013b).

Comments. Previously known from Brazil, Costa Rica, Honduras, Nicaragua, Panama, Peru, Suriname, and Venezuela (Makhan 2007; Longino 2013b; Bezděčková *et al.* 2015).

Pheidole boruca Wilson, 2003

Figs. 6B, 8A-8B

Material examined. COLOMBIA. Chocó. Unguía. Gilgal. Peñitas. 8°14'22.2"N 77°2'53.16"W. Winkler sample. Jan-2002. Serna, F. [1 major worker. UNAB, No. Catal. 4022].

Taxonomic identification. The specimen examined here is distinguished by the carinulae curving laterally above the eyes, face punctatorugose throughout but punctulated densely on the posterior quarter of dorsal surface of head; hypostomal margin straight, with blunt median tooth barely projecting outward and a pair of slightly larger teeth. This specimen matched Costa Rica specimens but differ in the sculpturation of posterior surface of head and median tooth length.

Comments. Previously known from Costa Rica, Honduras, and Nicaragua (Wilson 2003; Longino 2013a). In Colombia, this species is recorded in Chocó.

Pheidole bulliceps Wilson, 2003

Fig. 6B

Material examined. COLOMBIA. Santander. Florida-blanca. 7°04'11"N 73°05'52"W. 540 m. 13-Nov-2007. Maya, E. [1 major worker and 2 minor workers. ICN].

Taxonomic identification. The major worker examined here is distinguished by head in full frontal view completely



Figure 6. Distribution map of: **A.** *Kempfidris inusualis* and *Myrmicocrypta* species new records for Colombia. **B.** *Pheidole* species new records for Colombia.

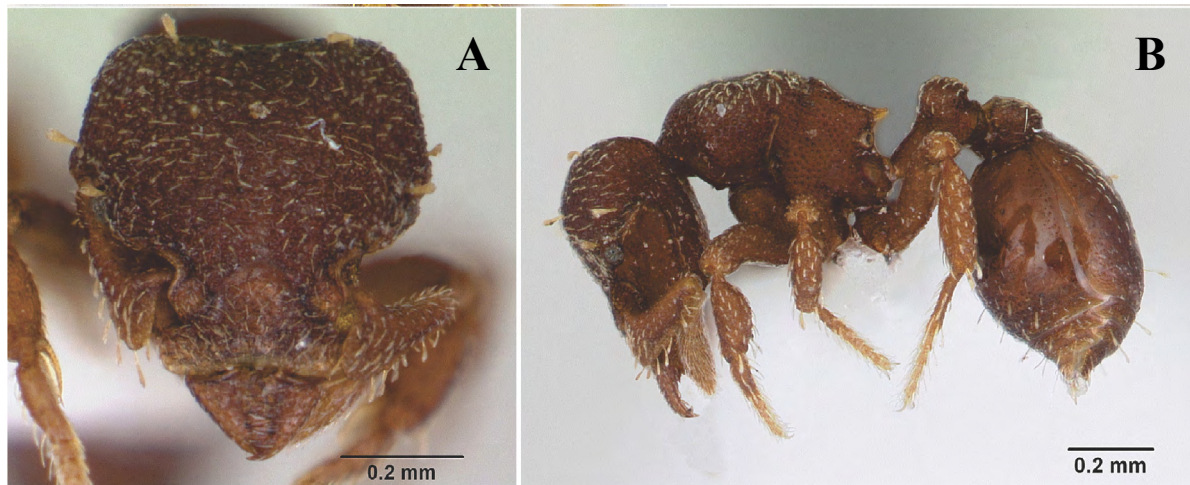


Figure 7. High-resolution images of the head in full-face view (A) and body profile (B) of the *Octostruma amrishi* worker. (CASENT0001969. Image by April Nobile, from www.antweb.org).

faveolated from the middle towards the posterior lobes, mandibles with lateral lamellae, short escapes. In lateral view, pronotum with smooth central portion, mesopleuron with transverse carinulae that continue in propodeum. In dorsal view, pronotum and mesonotum with carinulae curved downwards and propodeum with carinulae curved upwards. Petiole bilobed. Body covered with erect and short pilosity throughout. Ant reddish brown.

The minor workers, in frontal view, with the head smooth and developed nuchal neck; antennal scapes long. In lateral view, pronotum smooth and shiny, mesopleuron with transverse carinulae that continue to the propodeum, groove mesonotal impressed, propodeal spines present; first gastral tergite punctuated and with some longitudinal striations.

Comments. Previously known from Ecuador (Wilson 2003).

***Pheidole gertrudae* Forel, 1886**
Figs. 6B, 8C-8D

Material examined. COLOMBIA. Amazonas. Leticia. Vía Tarapacá Varzea. 2°52'44"S 69°44'38"W. 2002. Barriga. [1 minor worker. ICN].

Taxonomic identification. This specimen is very similar to minor worker described by Wilson (2003): no spines or some prolongation as a tooth in the propodeum, promesonotum in lateral view, completely convex, and propodeal spiracle large, ring-like. Body entirely smooth and shiny, except by mesopleuron that it is densely reticulated.

Comments. Previously known from Argentina, Brazil, Bolivia, Paraguay, and Peru (Forel 1886; Wilson 2003; Fernández and Sendoya 2004; Escalante-Gutierrez 1993).

***Pheidole harrisonfordi* Wilson, 2003**
Figs. 6B, 8E-8F

Material examined. COLOMBIA. Chocó. Unguía. Gilgal. Peñitas. 8°15'0"N 77°1'59.88"W. 7 m. Winkler sample. Jan-2002. Serna, F. [1 major worker. UNAB, No. Catal. 4024].

Taxonomic identification. The collected specimen in Chocó belongs to *Pheidole harrisonfordi* because presents mandible and clypeus smooth and shining; face covered with a dense reticulum of rugulae on the rest of the posterior half or more

of face, mesh-like, never rugulae parallel; gastral tergite entirely smooth and shiny; standing pilosity moderately abundant on head, mesosomal dorsum, and gastral dorsum. Body light reddish brown, appendages yellow.

Comments. Previously known from Belize, Costa Rica, Guatemala, Guyana, Honduras, México, Nicaragua, and Panama (Wilson 2003; Fernández and Sendoya 2004; LaPolla and Cover 2005). In Colombia, *Pheidole harrisonfordi* is known from the Choco rainforest, while other records in South America come from the northeastern side of the continent, in Guyana. This specimen matches with Wilson (2003)'s description, but it differs in having a relatively wider pronotum than the holotype (PW= 0.42 mm vs 0.36 mm, respectively); moreover, legs are relatively lighter in color.

***Pheidole hasticeps* Wilson, 2003**
Figs. 6B, 8G-8H

Material examined. COLOMBIA. Cundinamarca. Transecto Sumapaz. 1650 m. 28-Jul-1981. van der Hammen, T. [1 major worker and 1 dealate queen. ICN 016382].

Taxonomic identification. This species is easily distinguished by the surface of face smooth and shiny, parallel longitudinal rugae between eye and frontal carinae. Promesonotum very inflated, like a dome. Major worker yellow concolour, except mandibles and antero-clypeal margin brown reddish. Head and dorsum of mesosoma with less abundant pilosity than those Costa Rican specimens.

Comments. Previously known from Costa Rica, Mexico, and Panama (Wilson 2003; Fernández and Sendoya 2004).

***Pheidole indica* Mayr, 1879**
Figs. 6B, 9A-9D

Material examined. COLOMBIA. San Andrés y Providencia. Isla de San Andrés. Urban area. 12°35'00"N 81°42'00"W. 9-jul-2009. Fernández, F. [1 major and 1 minor worker. ICN].

Taxonomic identification. The specimens collected in San Andrés Island match well with the Fischer and Fisher (2013)

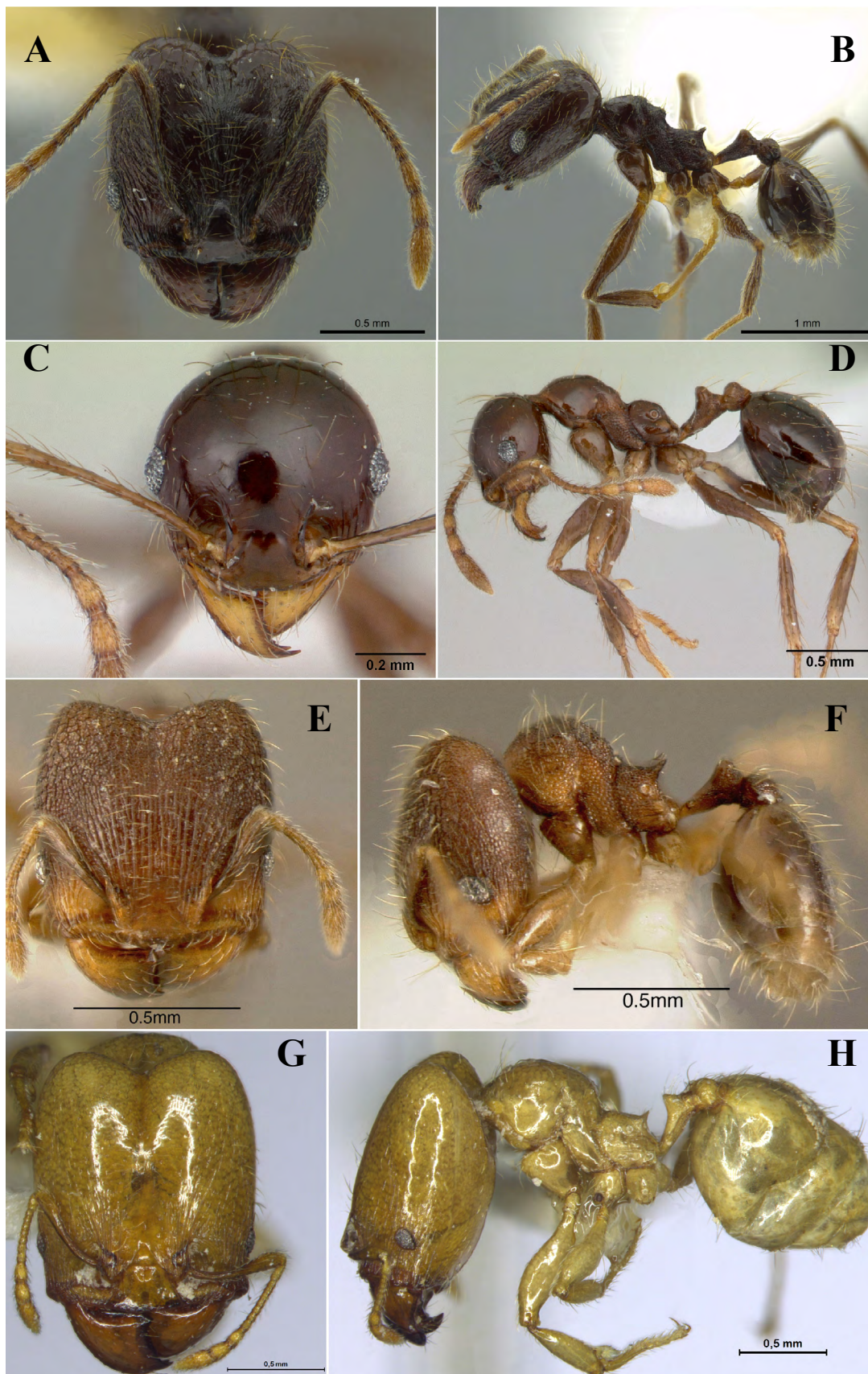


Figure 8. High-resolution images of the head in full-face view and body profile of *Pheidole* spp. **A-B.** *Pheidole boruca* major worker (INBIOCRI002279551. Image by Jeremy Pillow, from www.antweb.org). **C-D.** *Pheidole gertrudae* minor (CASENT0178029. Image by April Nobile, from www.antweb.org). **E-F.** *Pheidole harrisonfordi* (INBIOCRI001281891. Image by John T. Longino, from www.antweb.org). **G-H.** *Pheidole hasticeps* (Image by Emira I. García).

description. Major and minor worker ferruginous and light reddish brown legs.

Comments. An invasive species, previously known from the Canary Islands, the Mediterranean area, the Malagasy region, California, Cuba, Peru, and West Indian islands (Wilson 2003, Sarnat *et al.* 2015). Although the record comes from the San Andrés Island, which is very far from the Continent, this species could reach continental Colombia through tourism.

***Pheidole reichenspergeri* Santschi, 1923**

Figs. 9E-9F

Material examined. COLOMBIA. Santander. Fca. El Brasil. 1750-1850 m. Jun-2004. Benavides, L. and Rodriguez, E. [1 major and 2 minor workers, same pin. ICN, 021069].

Taxonomic identification. This species is distinguishable by the pronotum completely covered by transverse carinulae,

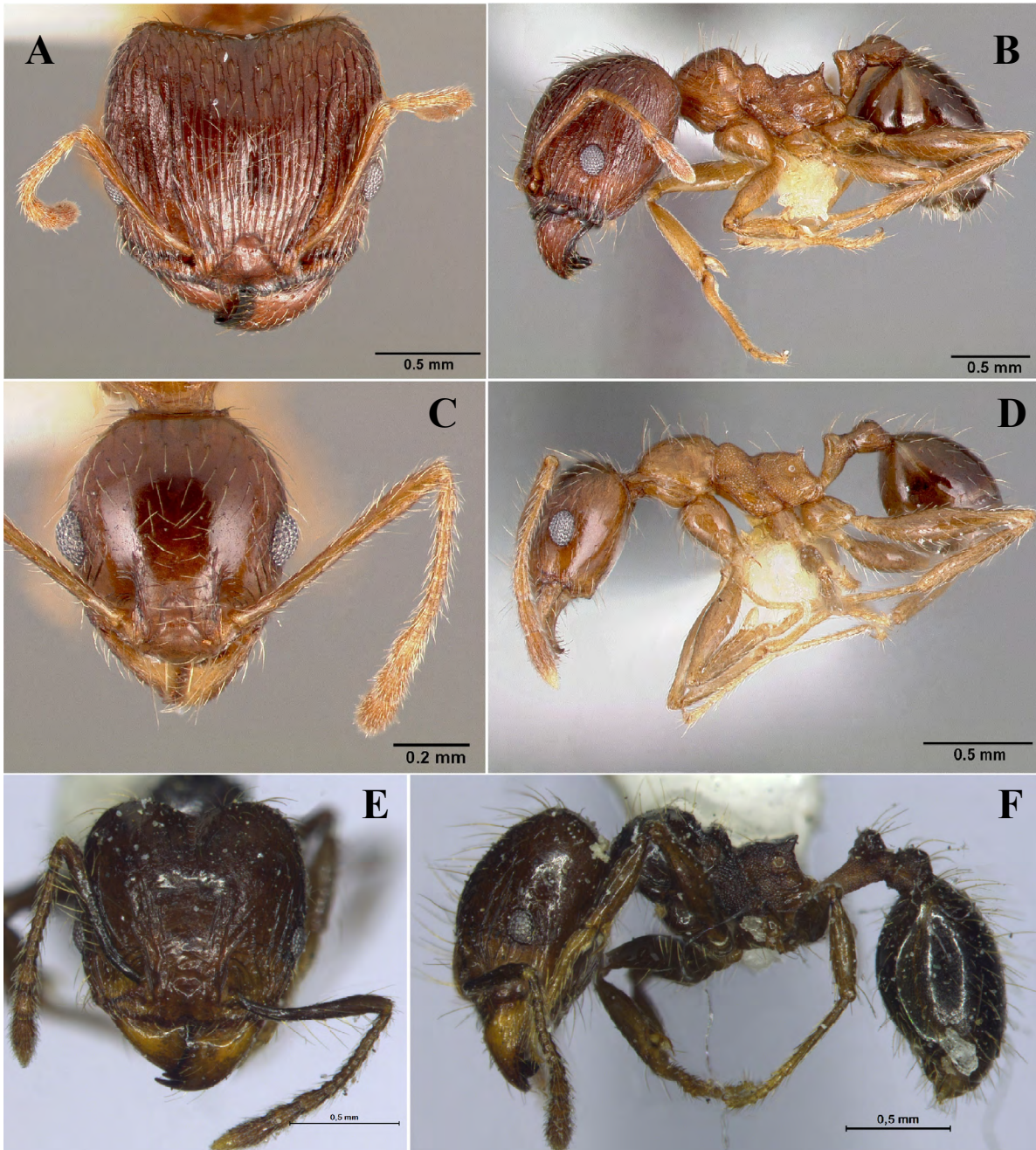


Figure 9. High-resolution images of the head in full-face view and body profile of *Pheidole* spp. **A-D.** *Pheidole indica* major (**A, B**) and minor worker (**C, D**) (CASENT0005777 and CASENT0005778, respectively). All images by April Nobile, from www.antweb.org. **E-F.** *Pheidole reichenspergeri* major worker (Image by Emira I. Garcia).

and pilosity dense and very long. The major worker studied here with malar area and mandible dorsal face yellowish.

Comments. Previously known from Brazil (Wilson 2003).

***Pheidole riveti* Santschi, 1911**

Fig. 6B

Material examined. COLOMBIA. Cundinamarca. Bogotá. Jardín Botánico José Celestino Mutis. 4°40'0.12"N

74°5'60"W. 2600 m. 23-Oct-2014. Cáceres, C. [1 minor worker. UNAB, No. Catal. 4023].

Taxonomic identification. The minor workers of this species can be distinguished by the head with semicircular carinulae much more conspicuous than those in *P. alfaroi* minor workers (also recorded in Cundinamarca). Moreover, the minor worker of *Pheidole riveti* with pronotum and katapisternum smooth, no transverse carinulae.

Comments. Previously known from Ecuador (Wilson 2003; Fernández and Sendoya 2004; Salazar *et al.* 2015).

***Pheidole scolioceps* Wilson, 2003**

Fig. 6B

Material examined. COLOMBIA. Meta. San Martín. Caduceo. Near to Rio Camoa. 3°40'01"N 73°39'43"W. 400 m. ex leaf litter. 11-May-2006. Ochoa, J.R. [2 major workers, 2 minor workers. ICN].

Taxonomic identification. *Pheidole scolioceps* major worker is distinguished by the broad area of transverse carinulae covering the posterior third of the head; major workers recorded here, however, with less transverse carinulae, and only minor workers yellow pale.

Comments. Previously known from Brazil, Ecuador, Guyana, French Guiana, and Peru (Wilson 2003; Salazar *et al.* 2015; LaPolla and Cover 2005; Groc *et al.* 2017; Fernández and Sendoya 2004).

***Pheidole sicaria* Wilson, 2003**

Fig. 6B

Material examined. COLOMBIA. Nariño. Barbacoas. Reserva Natural "El Pangan". 1°21'48.96"N 78°4'45.12"W. 640 m. Winkler. 25-29-Jul-2006. Miranda, A. and Reyes, O. [2 major workers, 2 minor workers. IAvH]; Nariño. Barbacoas. Reserva Natural "El Pangan". 1°21'48.96"N 78°4'45.12"W. 640 m. Pitfall. 26-28-Jul-2006. Miranda, A. and Reyes, O. [9 minor workers. IAvH]; Nariño. Barbacoas. Reserva Natural "El Pangan". 1°21'48.96"N 78°4'45.12"W. 640 m. Manual. 26-28-Jul-2006. Miranda, A. and Reyes, O. [3 minor workers. IAvH].

Taxonomic identification. Major and minor workers with face smooth and shiny, most notable in the minor worker. Minor worker with propodeal spines very long, but variable among ants from the study area: either as long as or longer than propodeal dorsum. Major worker with head covered with very abundant, very long, and slightly flexuous hairs.

Comments. Previously known from Costa Rica (Wilson 2003). This is the first record of this species for South America.

***Procryptocerus belti* Forel, 1899**

Fig. 10A

Material examined. COLOMBIA. Nariño. Tumaco. Universidad Nacional Sede Tumaco. 1°48'0"N 78°45'0"W. 5 m. Manual collection on dry twigs. 22-Sep-2015. Serna, F. [1 worker, UNAB, No. Catal. 4019]. Magdalena. Parque

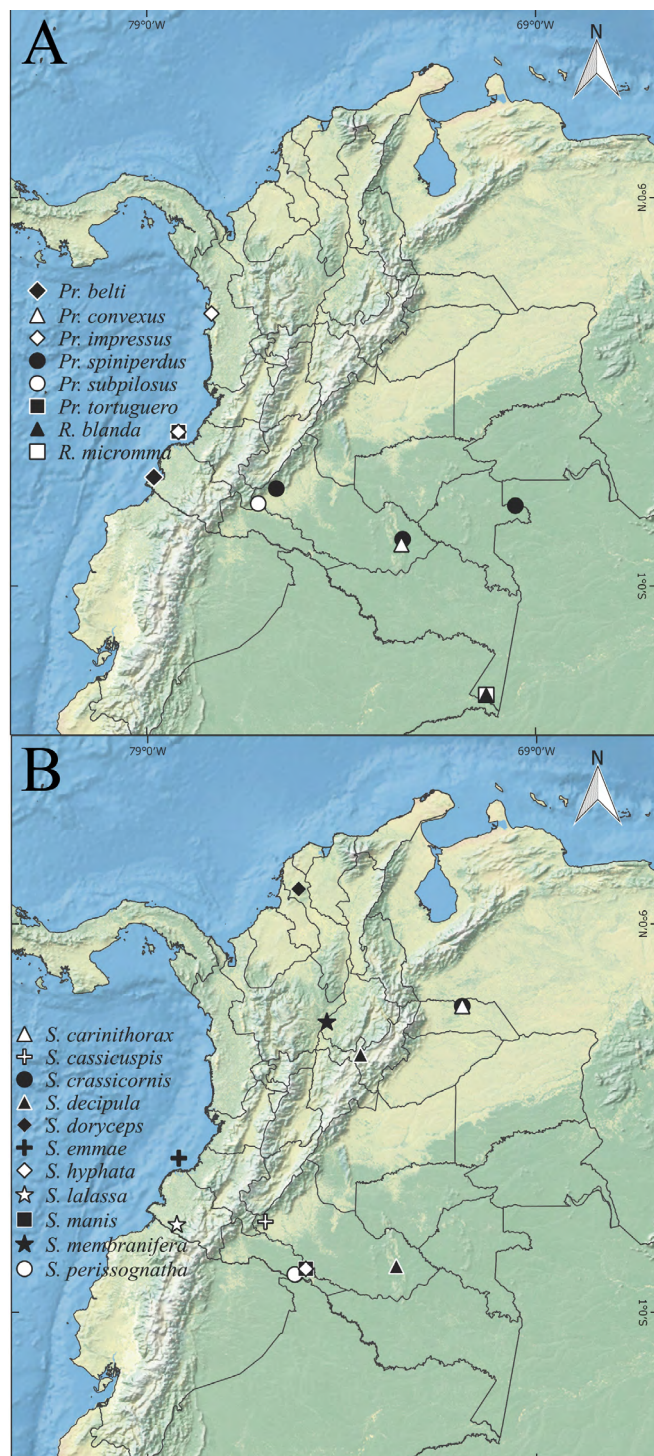


Figure 10. Distribution map of: **A.** *Procryptocerus* species new records for Colombia. **B.** *Strumigenys* species new records for Colombia.

Tayrona. Pueblito. 11.3064°N 74.0658°W. 15-Jul-1976. Kugler, C. [1 worker. IAvH-E 78133].

Taxonomic identification. This species can be distinguished from other Colombian *Procryptocerus* species by the promesonotum humped, and largest gastral tergite puncturate and covered with white subdecumbent hairs.

Comments. Previously known from Costa Rica, Ecuador, Honduras, Mexico, and Panama (Kempf 1951; Longino and Snelling 2002; Fernández and Sendoya 2004; Salazar *et al.* 2015).

***Procryptocerus convexus* Forel, 1904**

Fig. 10A

Material examined. COLOMBIA. Caquetá. Parque Nacional Natural Chiribiquete. Puerto Abeja. Bos. Planicie. 0°4'15.996"N 72°26'48.12"W. 260 m. Malaise. 14-23-Jan-2000. Arenas, C. [1 worker. IAvH-E 80216].

Taxonomic identification. This species can be distinguished from other Colombian *Procryptocerus* species by the clathrate frons and largest gastral tergite glossy, with fewer hairs than those on frons.

Comments. Previously known from Brazil (Forel 1904; Kempf 1951; Longino and Snelling 2002; Fernández and Sendoya 2004).

***Procryptocerus impressus* Forel, 1899**

Figs. 10A, 11A-11B

Material examined. COLOMBIA. Cauca. Parque Nacional Natural Gorgona. Mancora. 2°58'0.12"N 78°10'59.988"W. 60 m. Malaise. 6-20-Sep-2000. Duque, R. (M.904) [1 worker. IAvH]. Chocó. Parque Nacional Natural Utría. Cocalito. 6°1'0.12"N 77°19'59.88"W. 20 m. Malaise Dosel. 30-Jul-2000-16-Aug-2000. Pérez, J. (M.822) [1 worker. IAvH]. Cauca. Parque Nacional Natural Gorgona. Alto El Mirador. 12°58'0.12"N 78°10'59.88"W. 80 m. Malaise. 3-18-Jan-2001. Torres, H. (M.1231) [1 worker. IAvH].

Taxonomic identification. This species can be distinguished from other Colombian *Procryptocerus* species by the subfoveolate frons, with semicurved costulae, and the frontovertexal margin is crenulate, with scarce white spatulate short erect hairs.

Comments. Previously known from Brazil, Costa Rica, Ecuador, Nicaragua, and Panama (Forel 1899; Kempf

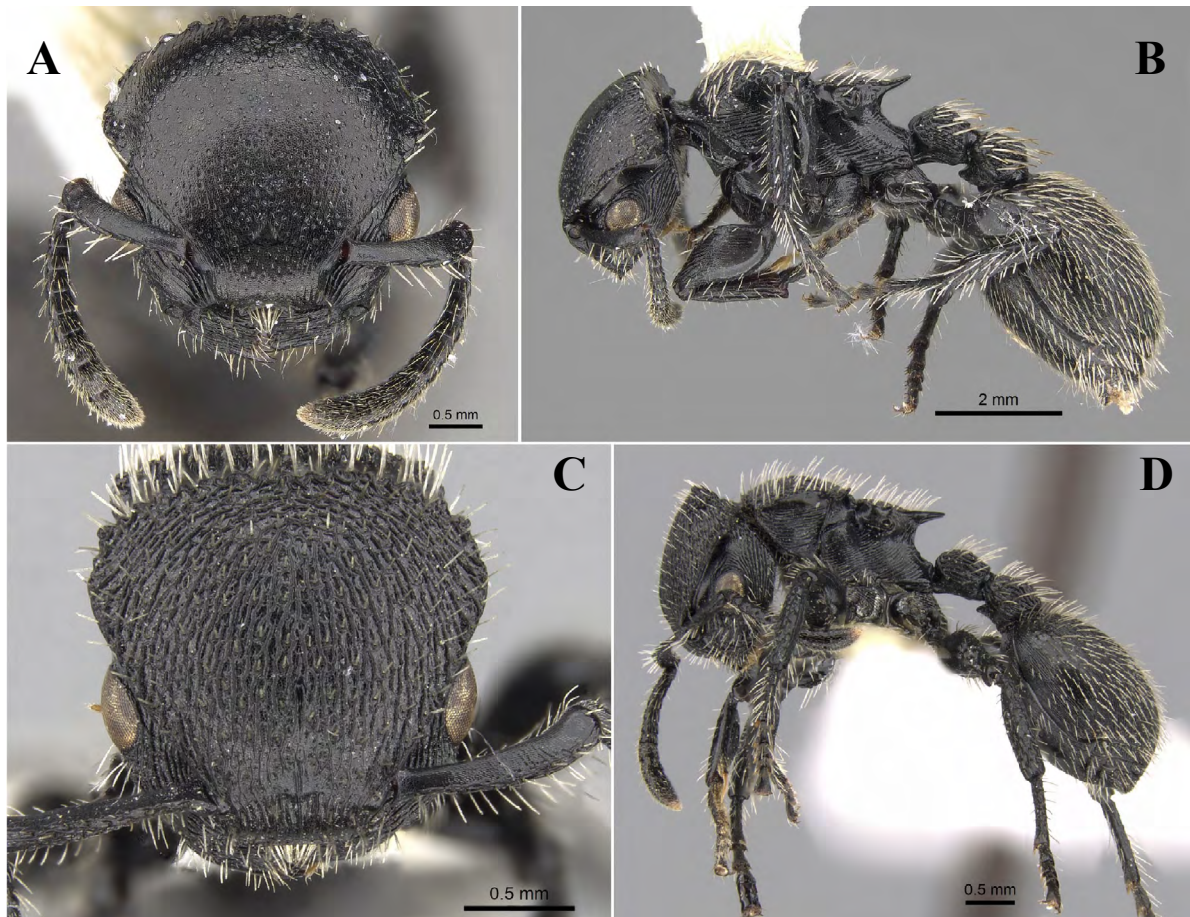


Figure 11. High-resolution images of the head in full-face view and body profile of the *Procryptocerus* worker. **A-B.** *Procryptocerus impressus* (CASENT0914488. Image by Dominique Monie, from www.antweb.org). **C-D.** *Procryptocerus spiniperdus* (CASENT0280790. Image by Estella Ortega, from www.antweb.org).

1951; Longino and Snelling 2002; Longino 2013a; Fernández and Sendoya 2004; Wilkie *et al.* 2010; Salazar *et al.* 2015).

***Procryptocerus spiniperdus* Forel, 1899**

Figs. 6C-6D, 11A

Material examined. COLOMBIA. Caquetá. Florencia. Vda. la Viciosa. CIMAZ. Macagual. 1°30'15.48"N 75°39'52.92"W. 263 m. En *Erythrina* sp. Manual collection. Dry twigs. 17-May-2017. Serna, F. [7 workers, 1 gyne. UNAB, No. Catal. 4020]; Caquetá. Puerto Solano. Parque Nacional Natural Serranía de Chiribiquete. Cuñare Amu. 0°12'0"N 72°25'0.12"W. 300 m. Bosque de tierra firme. Malaise. 14-17-Feb-2001. Ospina, M. and González, E. (M.1388) [2 workers. UNAB]. Vaupés. Estación Biológica Mosiro-Ytajura (Caparú). Antigua Cabaña. 1°4'0.12"N 69°31'0.12"W. 60 m. Malaise. 4-11-Mar-2003. Pinzón, J. (M.3630) [1 worker. UNAB].

Taxonomic identification. This species can be distinguished from other Colombian *Procryptocerus* species by the rivose striate-costate frons and the frontovertexal margin notably crenate.

Comments. Previously known from Brazil, Ecuador, Peru, Trinidad, and Lesser Antilles (Forel 1899; Majer and Delabie 1999; Kempf 1951; Fernández and Sendoya 2004; Salazar *et al.* 2015; Bezděčková *et al.* 2015).

***Procryptocerus subpilosus* (Smith, 1860)**

Fig. 10A

Material examined. COLOMBIA. Putumayo. Mocoa. Jardín Botánico Tropical Amazónico. 1°7'8.04"N 76°7'53.76"W. 450 m. Colecta manual. *Miconia* sp. (Melastomataceae), ramas secas. Serna, F. [15 workers. UNAB, No. Catal. 4021].

Taxonomic identification. This species can be distinguished from other Colombian *Procryptocerus* species by the notopropodeum flat, frons subfoveolate, relatively smooth, and frontovertexal corners slightly curvate dorso laterally.

Comments. Previously known from Brazil, Ecuador, and Peru (Kempf 1951; Longino and Snelling 2002; Fernández and Sendoya 2004; Bezděčková *et al.* 2015; Salazar *et al.* 2015).

Janicki *et al.* (2016) recorded this species for Colombia in spite of the uncertainty exposed by Fernández *et al.* (1996:379), who clearly indicated that *P. subpilosus* was possibly present in the country, but never presented data to support its distribution in Colombia. F. Serna, one of the authors herein, collected and identified some specimens from Putumayo (material examined), supporting the first record of this species for Colombia.

***Procryptocerus tortuguero* Longino and Snelling, 2002**

Fig. 10A

Material examined. COLOMBIA. Cauca. Parque Nacional Natural Gorgona. El Roble. 2°58'0.12"N 78°10'59.88"W. 130 m. Malaise. 20-Feb-2001. 6-Mar-2001. Torres, H. (M.1475) [2 workers. IAvH].

Taxonomic identification. This species can be distinguished from other Colombian *Procryptocerus* species by the regularly scattered white short hairs on frons, and the crenate frontovertexal margin.

Comments. Previously known from Costa Rica (Longino and Snelling 2002; Fernández and Sendoya 2004). This is the first record of this species for South America.

***Rogeria blanda* (Fr. Smith, 1858)**

Fig. 10A

Material examined. COLOMBIA. Amazonas. Parque Nacional Natural Amacayacu. 3°48'37.08"S 70°15'58.32"W. 88 m. Forest, rotten wood. Winkler sample. 7-Oct-2007. Schultz, T.R. and Johnson, S. (TRS071007-WS07) [2 workers. USNM].

Taxonomic identification. This species can be distinguished from other *Rogeria* species by having a palpal formula 2:2, metanotal groove weak, and petiolar node long and low (Kugler 1994).

Comments. Previously known from Costa Rica, Ecuador, Guyana, Panama, Peru, Trinidad, and Venezuela (Smith 1858; Kugler 1994; Fernández and Sendoya 2004; LaPolla and Sosa-Calvo 2006; Wilkie *et al.* 2010; Salazar and Donoso 2013; Bezděčková *et al.* 2015; Salazar *et al.* 2015; Donoso 2017).

***Rogeria micromma* Kempf, 1961**

Fig. 10A

Material examined. COLOMBIA. Amazonas. National Park Amacayacu. 3°48'37.08"S 70°15'58.32"W. 88 m. Forest, leaf litter. Winkler sample. 7-Oct-2007. Sosa-Calvo, J. and Rodriguez, J. (JSC071007-LS01, JSC071007-LS02, LS04, LS06, LS08) [5 workers, 1 dealate queen. USNM]; Amazonas. National Park Amacayacu. 3°48'37.08"S 70°15'58.32"W. 88 m. Forest, rotten wood. Winkler sample. 7-Oct-2007. Schultz, T.R. and Johnson, S. (TRS071007-WS07) [1 worker. USNM].

Taxonomic identification. This species can be distinguished from other *Rogeria* species by having eyes small, with 2-5 facets, dorsum of mesosoma with 8-10 pairs of erect hairs, and sides of head and mesosoma shinier (Kugler 1994).

Comments. Previously known from Guiana (Kempf 1972), Ecuador and Suriname (Kempf 1961; Kugler 1994; Fernández and Sendoya 2004; LaPolla and Sosa-Calvo 2006; Wilkie *et al.* 2010; Salazar *et al.* 2015).

***Strumigenys carinithorax* Borgmeier, 1934**

Figs. 10B, 12A-12B

Material examined. COLOMBIA. Arauca. Arauquita. Caño Limón. 6°53'4.92"N 70°54'35.28"W. 2000-2001. [1 worker. ICN].

Taxonomic identification. This specimen presents the combination of characters that distinguish *Strumigenys carinithorax* from any other relatively close species: a median fine longitudinal carina on the mesonotum and

subreclinate spatulate hairs on the dorsum of the head. In addition, petiole node in profile without spongiform tissue ventrally, and scattered pilosity fine on the surface of first gastral tergite.

Comments. Previously known from Brazil, Costa Rica, Panama, Paraguay, Suriname, and Venezuela (Borgmeier 1934; Bolton 2000; Fernández and Sendoya 2004; Lattke and Riera-Valera 2012).

***Strumigenys cassicuspis* (Bolton, 2000)**

Fig. 10B

Material examined. COLOMBIA. Caquetá. San José de Fragua. R. Turayaco. 1°19'43"N 75°58'22"O. 1500-2000 m. Winkler. 09-Jan-2000. González, E.L. [1 worker. IAvH-E 113433].

Taxonomic identification. This species can be distinguished from other Colombian *Strumigenys* species by having

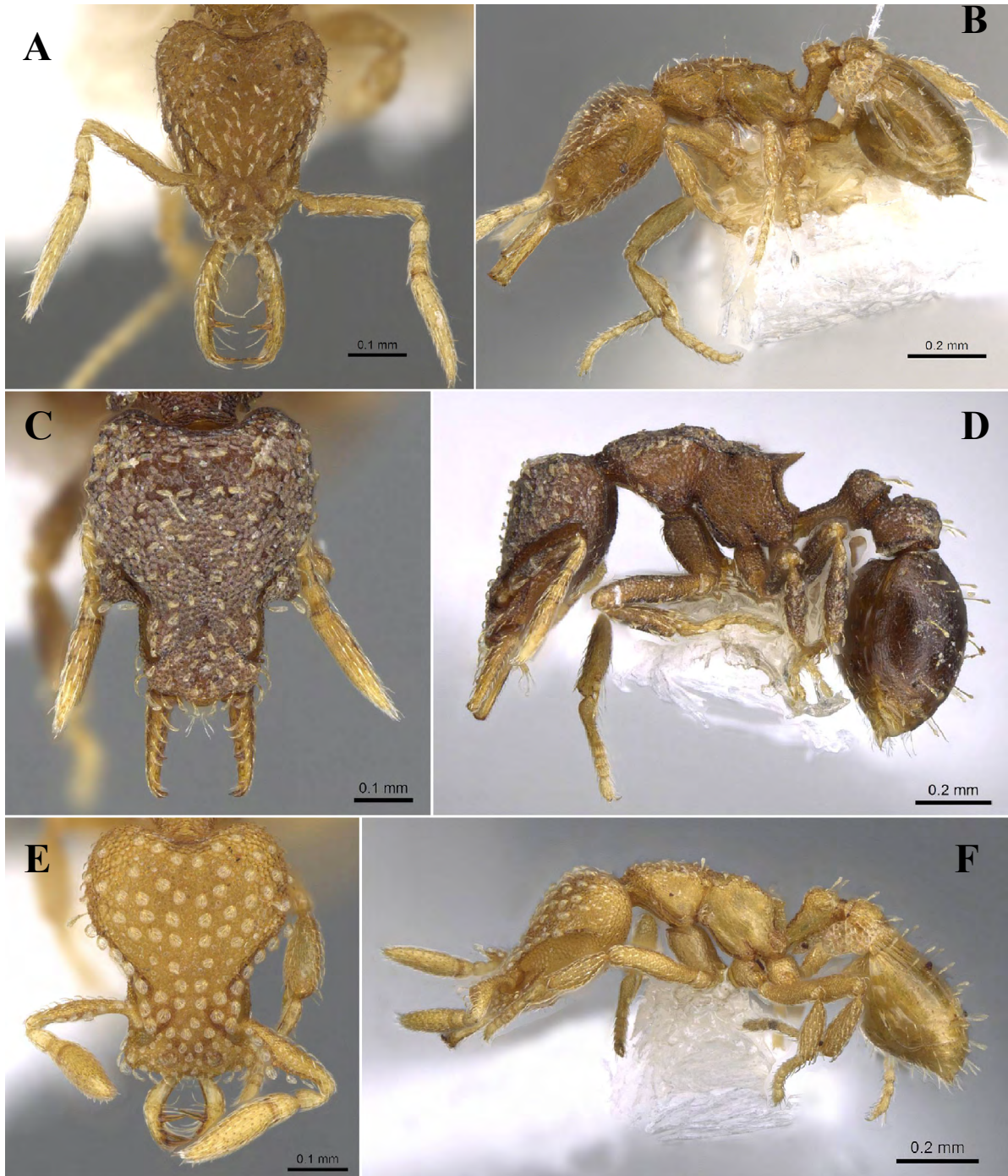


Figure 12. High-resolution images of the head in full-face view and body profile of the *Strumigenys* worker. **A-B.** *Strumigenys carinithorax* (CASENT0902309. Image by Zach Lieberman, from www.antweb.org); **C-D.** *Strumigenys crassicornis* (CASENT0914684. Image by Zach Lieberman, from www.antweb.org). **E-F.** *Strumigenys emmae* (CASENT0914790. Image by Zach Lieberman, from www.antweb.org).

occipital lobes strongly expanded laterally in full-face view with abundant short stubbly projecting erect hairs and without numerous small peaks or tubercles. Mandibles at full closure triangular, with serially dentate masticatory margins, five sharp teeth, outer edge of scape with a row of freely projecting spoon-like hairs, femoral gland bullae elongate and conspicuous, dorsum of head behind clypeus and dorsal mesosoma with fine dense reticulate-punctate sculpture.

Comments. Previously known from Belize, Costa Rica, Guatemala, Honduras, Nicaragua, and Panama (Bolton 2000; Fernández and Sendoya 2004).

***Strumigenys crassicornis* Mayr, 1887**

Figs. 10B, 12C-12D

Material examined. COLOMBIA. Arauca. Arauquita. Caño Limón. 6°53'4.92"N 70°54'35.28"W. 2000-2001. [5 workers. ICN].

Taxonomic identification. The specimens examined here are distinguished by the scape narrow basally, inner margin of mandible at the midlength with a submedian tooth or denticle notably enlarged, pronotum in profile broad and flattened, and postpetiole swollen and subglobular.

Comments. Previously known from Argentina, Brazil, French Guiana, Guyana, Suriname, Trinidad, Paraguay, and Venezuela (Mayr 1887; Kempf 1972; Bolton 2000; Fernández and Sendoya 2004; Groc *et al.* 2017; Sosa-Calvo 2007; Sosa-Calvo *et al.* 2010).

***Strumigenys decipula* (Bolton, 2000)**

Fig. 10B

Material examined. COLOMBIA. Boyacá. Santuario Flora y Fauna Iguaque. El Nispero. 5°38'4.92"N 73°31'35.4"W. 2730 m. Winkler. 19-25-Jan-2002. Reina, P. (PR3069) [1 worker. IAvH-E 90795]. Caquetá. Solano. Parque Nacional Natural Chiribiquete. R. Sararamano. 0°11'12.12"N 0°11'12.12"W. 300 m. Bosque cerro. Winkler sample. 17-Apr-2000. González, E. [1 worker. IAvH-E 79376, E 79375].

Taxonomic identification. This species can be distinguished from other *Strumigenys* species in Colombia by having mandible elongate and sublinear, inner margins strongly convex in full-face view, at full closure touching at about the midlength, apex of mandible with two very tiny intercalary denticles between apicodorsal and apicoventral teeth. Further, scape at the subbasal angle lobate, smaller eyes, with only 3 ommatidia in the longest row, and no standing hairs on the dorsal mesosoma.

Comments. Previously known from Ecuador, Peru, and Brazil (Bolton 2000; Fernández and Sendoya 2004; Bezděčková *et al.* 2015; Salazar *et al.* 2015).

***Strumigenys doryceps* (Bolton, 2000)**

Fig. 10B

Material examined. COLOMBIA. Bolívar. Santuario Flora y Fauna Los Colorados. La Yaya. 9°54'0"N

75°7'0.12"W. 280 m. Winkler. 9-13-Apr-2001. Deulufeut, E. (M.1830) [2 workers. IAvH-E 90777].

Taxonomic identification. The specimens are distinguishable by the elongated head, mandibles in full-face view triangular elongate, bulge outwards basally beyond the line of the clypeal margin, anterior clypeal margin narrowly rounded, hairs on clypeal margins fine, simple flexuous strongly curved, and disc of postpetiole smooth.

Comments. Previously known from Ecuador (Bolton 2000; Fernández and Sendoya 2004; Salazar *et al.* 2015).

***Strumigenys emmae* (Emery, 1890)**

Figs. 12E-12F, 10B

Material examined. COLOMBIA. Cauca. Parque Nacional Natural Gorgona. El Saman. 2°58'1.2"N 78°11'59.64"W. 5 m. Winkler. 9-10-Aug-2001. Torres, H. (M.2132) [1 worker. AvH-E 90681]. San Andrés y Providencia. Isla Magali Hill. Km 11 Circunvalar. 4-Jan-2006. Castellanos, F. (Ca12r12) [1 worker. ICN].

Taxonomic identification. This species is easily distinguished by the dorsum of head and promesonotum with scale-like to orbicular-shape hairs. Both specimens with first gastral tergite with a few erect hairs feebly expanded apicad.

Comments. Pantropical distribution (tramp species) (Emery 1890; Bolton 2000; Fernández and Sendoya 2004; Sosa-Calvo *et al.* 2006). Achury and Suarez (2017) previously recorded this species from Antioquia; here, we expanded its range of distribution to insular areas with records from San Andres Island in the Caribbean Sea, and Gorgona Island in the Colombian Pacific Ocean.

***Strumigenys hyphata* (Brown, 1953)**

Figs. 10B, 13A-13B

Material examined. COLOMBIA. Putumayo. Parque Nacional Natural La Paya. Cabaña La Paya. Chagra. 0°7'0.12"N 74°55'59.88"W. 320 m. Winkler sample. 30-Apr-2002-01-May-2002. Cobete, R. (M.3154) [1 worker. IAvH-E 90754].

Taxonomic identification. The specimen is distinguishable by the numerous long wire-like, very broadly curved conspicuous hairs on cephalic dorsum immediately behind clypeus.

Comments. Previously known from Bolivia, Brazil, French Guiana, Peru, Suriname, Trinidad and Tobago, and Venezuela (Brown 1953; Bolton 2000; Fernández and Sendoya 2004; Groc *et al.* 2009).

***Strumigenys lalassa* (Bolton, 2000)**

Figs. 13C-13D, 10B

Material examined. COLOMBIA. Nariño. Reserva Natural La Planada. Parcela Olga. 1°15'0"N 78°15'0"W. 1850 m. Winkler sample. 20-22-Oct-2000. Oliva, G. (1408) [1

worker. IAvH-E 90775]; Nariño. Reserva Natural La Planada. Vía Hondón. 1°15'0"N. 78°15'0"W. 1930 m. Winkler sample. 2-Jul-2001. Oliva, G. (2408) [2 workers. IAvH-E 90786]; Nariño. Reserva Natural La Planada. Parcela Permanente. 1°15'0"N. 78°15'0"W. 1885 m. Winkler sample. 16-20-Apr-2001. Oliva, G. (2354) [3 workers. IAvH-E 90790].

Taxonomic identification. *Strumigenys lalassa* workers are characterized by the following character combination: curved hairs on outer edge of scape very broadly spatulate, apiscrobal hair absent, no standing hairs on the mesonotum, mandibles sublinear ventral surface of petiole with a strip or

curtain of spongiform tissue, and disc of postpetiole densely reticulate-punctate.

Comments. Previously known from Costa Rica, Panama, Ecuador, Nicaragua, and Venezuela (Bolton 2000; Fernández and Sendoya 2004; Sosa-Calvo *et al.* 2006; Salazar *et al.* 2015). *S. lalassa* was recorded for Colombia by Fernández and Sendoya (2004), but without information to validate the record. The specimens examined here come from a protected forest area in southern Colombia; voucher specimens are deposited in IAvH.

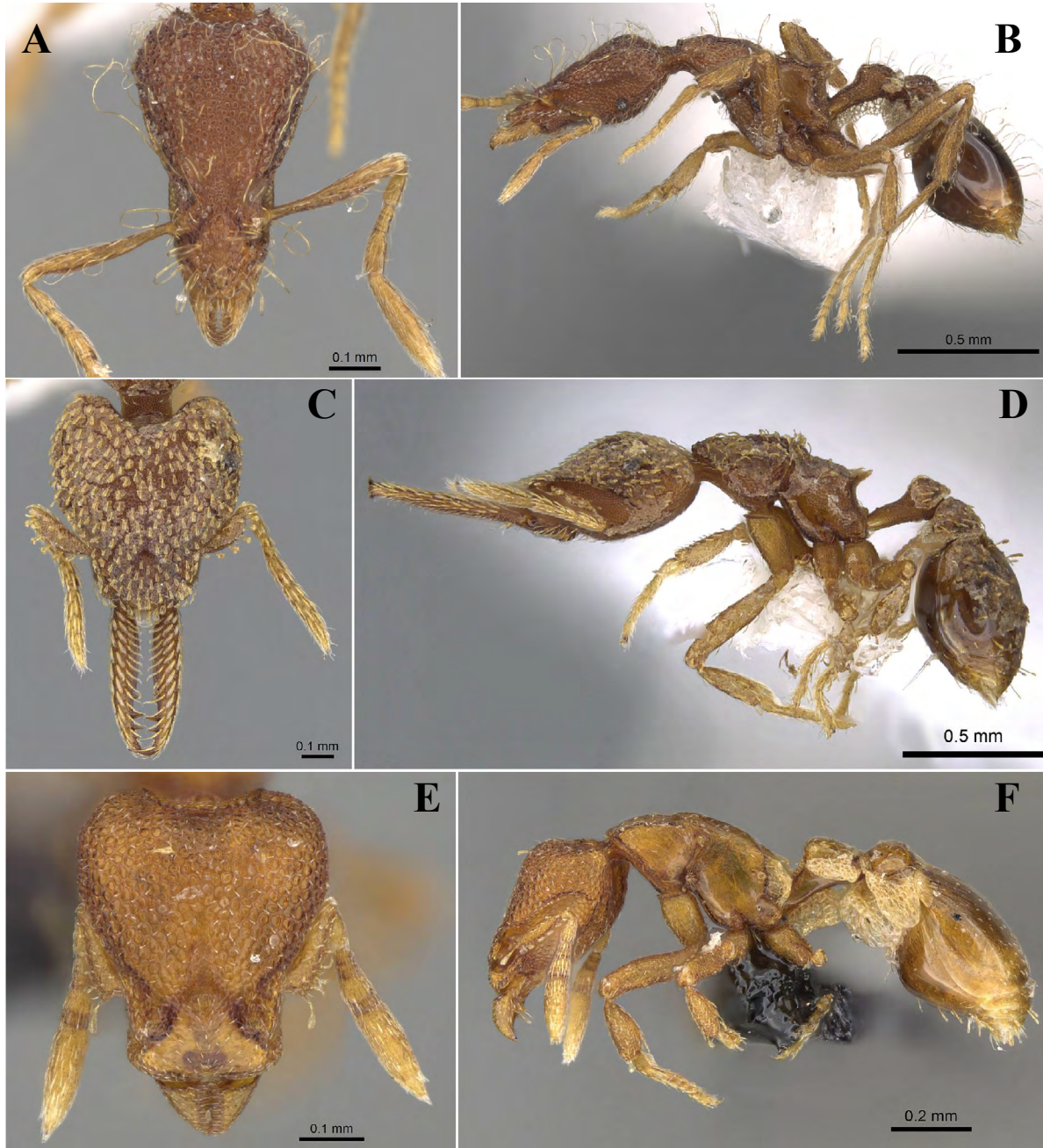


Figure 13. High-resolution images of the head in full-face view and body profile of the *Strumigenys* worker. **A-B.** *Strumigenys hyphata* (CASENT0281991. Image by Shannon Hartman, from www.antweb.org). **C-D.** *Strumigenys lalassa* (CASENT0914597. Image by Zach Lieberman, from www.antweb.org). **E-F.** *Strumigenys membranifera* (CASENT0023769. Image by Michele Esposito, from www.antweb.org).

***Strumigenys manis* Bolton, 2000**

Fig. 10B

Material examined. COLOMBIA. Putumayo. Parque Nacional Natural La Paya. Cabaña La Paya. Chagra. 0°7'0.12"N 74°55'59.88"W. 320 m. Winkler sample. 15-16-Apr-2002. Cobete, R. (3155) [1 worker. IAvH-E 90736].

Taxonomic identification. The only worker studied of this species can be identified by having mandibles linear, with a preapical tooth and a minuscule denticle just proximal of midlength (difficult to see) and without intercalary dentition; additionally, outer edge of scape with all hairs curved or inclined toward the apex of the scape.

Comments. Previously known from Mexico (Bolton 2000; Fernández and Sendoya 2004). This is the first record of this species for South America.

***Strumigenys membranifera* Emery, 1869**

Figs. 10B, 13E-13F

Material examined. COLOMBIA. Santander. Cimitarra. Ecopetrol. 6°28'1.56"N 74°23'30.48"W. 118 m. Potrero soleado D. 2-Jun-2011. Urrutia, M. (COD017) [1 worker. ICN]. San Andrés y Providencia. Isla Magali Hill. Km 110 m, Circunvalar I. Castellanos, F. (CA08M5, CA17M5) [1 worker. ICN].

Taxonomic identification. Workers with mandibles short triangular with a distinct sharp transverse edge or rim, parallel and in front of the anterior clypeal margin, mesosoma in dorsal view smooth, pronotum sharply marginate laterally, and propodeum with a broad lamella, this incorporating the propodeal teeth.

Comments. Cosmopolitan species (tramp species) (Emery 1869; Bolton 2000; Fernández and Sendoya 2004).

***Strumigenys perissognatha* (Bolton, 2000)**

Fig. 10B

Material examined. COLOMBIA. Putumayo. Parque Nacional Natural La Paya. Cabaña. 0°2'1.32"S 75°12'30.24"W. 330 m. Winkler sample. 1-5-May-2002. Magno, L. (3171) [1 worker. IAvH-E 80427]; Putumayo. Parque Nacional Natural La Paya. 0°1'39.036"S 75°13'4.872"W. 201 m. Winkler sample in mature forest. 2002. Rivera, D. [1 worker. ICN].

Taxonomic identification. The workers of this species can be distinguished by having head in profile extremely dorsoventrally flattened, mandibles in full view short and powerful, along with diamond shaped frontal lobes and frontal carinae enormously expanded laterally, pronotum not marginate dorso laterally, and mesosoma entirely smooth.

Comments. Previously known from Brazil (Bolton 2000; Fernández and Sendoya 2004).

***Tranopelta subterranea* (Mann, 1916)**

Fig. 2A

Material examined. COLOMBIA. Amazonas. Leticia. Parque Nacional Natural Amacayacu. Com. Monilla amena.

3°48'37.08"S 70°1558.319"W. 70 m. F. A. M. (FOR3102 Duplicate) [5 workers. MUPJ].

Taxonomic identification. The worker of this species can be distinguished by having the promesonotum and propodeum clearly convex in lateral view, separated by a broad metanotal groove (Fernández 2003a).

Comments. Previously known from Bolivia, Brazil, Ecuador, and Peru (Mann 1916; Fernández 2003a; Wilkie *et al.* 2009, 2010; Salazar *et al.* 2015).

Discussion

Ants are a relatively conspicuous group of insects in the forest ecosystems of tropical latitudes (Hölldobler and Wilson 1990). Colombia due to its geographical position provides a high heterogeneity of habitats that have favored the establishment of a very diverse myrmecofauna. The new records that we provide here increase the number of species known from the country into 1,200 species; this corresponds to approximately 34% of the ant species richness of the Neotropics. The richness of genera is also relatively high (Colombia = 105 vs. Neotropical region = 126), and almost equal to that of Brazil, which has seven genera not registered in Colombia (see Bolton 2018).

The remarkable increase in knowledge of ant fauna in Colombia has been the result of both, the exploration of forests within the National Natural Parks and the application of new sampling methodologies (especially litter-leaf sampling). The interaction of these factors has allowed the collection of large numbers of ant samples that are expected to be studied. As a result of the partial study of this biological material, it is recorded for the first time for Colombia 47 species in Myrmicinae, in addition to the new record of the genus *Kempfidris* for Colombia and some species new records for South America.

The subfamily Myrmicinae, the most speciose within Formicidae, has a remarkable numerical representation in Colombia, totaling 50 genera and about 223 species. In addition, this is the first record of *Kempfidris* from ants collected in the Colombian Amazon rainforest. This genus and its only species (*K. inusualis*) were previously registered in Brazil, Ecuador, Peru, and Venezuela (Fernández *et al.* 2014; Camacho and Feitosa 2016). It is also present new records for South America of species collected in Colombia: *Pheidole sicaria*, *Procryptocerus tortuguero*, and *Strumigenys manis*, which were only known from Central America. The diversity of *Pheidole* in Colombia is relatively high, reaching about 120 species, a richness similar to that of countries like Costa Rica whose ant fauna is relatively well studied (157 known *Pheidole* species).

The diversity of ants recorded here includes three invasive species, *Pheidole indica*, *Strumigenys emmae*, and *Strumigenys membranifera*. These records increase by almost twice the number of invasive ant species in Colombia. Recently, an increase of invasive species (more than 300 species) has been observed within the Colombian territory (Gutiérrez 2006; López-Arevalo *et al.* 2014), a situation that ignites the alarms due to the threat that these species represent on the native biodiversity, the health of the natural ecosystems and the human health. However, the presence of these tramp ants and the Argentine ant (Wild 2007; Escárraga

and Guerrero 2016) in Colombia have gone unnoticed. The greatest attention has been directed to other invertebrate or vertebrate groups such as the African snail (*Achatina fulica* (Bowdich, 1822)) or the lionfish (*Pterois volitans* Linnaeus, 1758), ignoring the negative effect that some ants such as the Argentine ant (*Linepithema humile* Mayr, 1868) has had on the loss of the ecological and historical structure in natural communities (Sanders *et al.* 2003; Lessard *et al.* 2009). The behavior of *Linepithema humile*, which has such negative implications, can also be extended to any of the other tramp species reported in this study.

Colombia, along with countries such as Brazil and Costa Rica, exhibits a diversity of ants that has been extensively studied, however, the loss of habitat and the lack of funding to advance in alpha-taxonomy research, seriously jeopardizes the knowledge and conservation of this biodiversity. Despite this, the ongoing peace process in Colombia opens new possibilities to reach geographic areas that were previously of difficult access, a situation that will make possible to document the fauna of ants that inhabit the country.

Acknowledgements

RJG was supported by Fonciencia-Unimagdalena through the “Taxonomy and distribution of *Pheidole* ants (Formicidae: Myrmicinae) from Colombia” research project (Agreement 006 of 2016). RJG and FF give full thanks to Jack Longino for developing the *Pheidole* Ant Taxonomy workshop at Universidad del Magdalena and helping with the project “*Pheidole* from Colombia”. The Vicerrectoría de Investigación-Universidad de Magdalena funded The *Pheidole* Ant Taxonomy workshop through the grant for mobility experts. JSC was supported by NSF grants DEB-1456964 and DEB-1654829. EIG was supported by Colciencias-Unimagdalena (research project FP44842-008-2015, Code1117-658-42796). We are indebted to Lina María Ramos-Ortega and C. Kwapich for formatting the manuscript and help with English.

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Received: 18-Sep-2018 • Accepted: 25-Oct-2018

Suggested citation:

GUERRERO, R. J.; FERNÁNDEZ, F.; ESCÁRRAGA, M. E.; PÉREZ-PEDRAZA, L. F.; SERNA, F.; MACKAY, M. P.; SANDOVAL, V.; VERGARA, V.; SUÁREZ, D.; GARCÍA, E. I.; SÁNCHEZ, A.; MENESES, A. D.; TOCORA, M. C.; SOSA-CALVO, J. 2018. New records of myrmicine ants (Hymenoptera: Formicidae) for Colombia. *Revista Colombiana de Entomología* 44 (2): 238-259. Julio - Diciembre 2018.