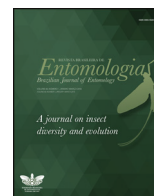




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Leptogenys pujoli, a new amazonian species, and the redescription of *Leptogenys famelica* Emery, 1896 (Formicidae: Ponerinae)

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ABSTRACT

We provide an update on the *famelica* species group, redescribing *Leptogenys famelica* Emery, 1896 and describing a new species, *Leptogenys pujoli* n. sp., based on worker specimens. The new species is smaller than *L. famelica* and can be distinguished by the indistinct mesometanotal suture, and the petiolar node with an anterodorsal margin mostly straight anterior to spiracle in lateral view. *Leptogenys famelica* is distributed from Costa Rica to Panama, while *L. pujoli* n. sp. is distributed throughout the Brazilian Amazon, from French Guiana to Bolivia. Some records previously attributed to *L. famelica* remain uncertain, potentially being either *L. famelica* or *L. pujoli* n. sp., or perhaps representing one or more undescribed species. We update the key to *Leptogenys* workers by Lattke (2011) and include images. We synthesize available knowledge about the possible biology of these species and propose that both *L. famelica* and *L. pujoli* n. sp. are generalist predators and that their reproduction is dependent on gamergates.

Introduction

Leptogenys is the richest genus in the subfamily Ponerinae, with 318 valid species, of which, at least 84 species are known for the Neotropical Region (Lattke, 2011; López-Muñoz et al., 2018; Tozetto et al., 2022; Bolton, 2024). The genus has a Pantropical distribution, its species can be found nesting on the ground, in leaf litter or rotting wood, and some were even found nesting inside abandoned termitaries (Bolton, 1975; Duncan and Crewe, 1994; Dejean et al., 1996; Ito and Ohkawara, 2000). Mostly of *Leptogenys* species are known by present ergatoid queen, though winged queens and worker reproduction has also been reported (Schmidt and Shattuck, 2014). Not much is known about predation in this genus, but there is a tendency for specialization upon terrestrial isopods (Dejean and Evraerts, 1997). Some Asian species have a unique behavior within the genus, such as an army ant lifestyle and “daisy-chaining” prey retrieval (Witte and Maschwitz, 2000; Peeters and De Greef, 2015; Arimoto and Yamane, 2018).

There are only four recent taxonomic works for the Neotropical *Leptogenys* species: **1.** New World species revision and identification key (Lattke, 2011); **2.** Two new species descriptions (López-Muñoz et al., 2018); **3.** A new species and the descriptions of several males (Tozetto et al.,

2022); **4.** A key for the Colombian species (Fernández and Guerrero, 2019). However, in the same period, several papers have been published with new species descriptions and identification keys for the genus in other regions (Bakhtiar and Chiang, 2010; Zhou, 2012; Bharti and Wachkoo, 2013; Eguchi et al., 2014; Rakotonirina and Fisher, 2014; Xu and He, 2015; Arimoto, 2017; Sharaf et al., 2017; Arimoto and Yamane, 2018; Wachkoo et al., 2018; Ramage et al., 2019; Heterick, 2021; Subedi et al., 2022). The recent history indicates that, although several taxonomic works are being carried out for the genus, there is still a lack of broad revisions for Africa, Southeast Asia, and Americas.

Even in regions where there is recent work, our knowledge behind the taxonomy of the genus still has many gaps concerning the species range and intraspecific morphological variation, perhaps related to the nature of reproductive females and the difficulty of sampling *Leptogenys* specimens. Flightless reproductive females do not favor broad species ranges and may promote allopatric speciation, which would be responsible for the many local species known for the genus (Ward, 1989; Peeters and Ito, 2001; Rakotonirina and Fisher, 2014). Despite their great diversity, *Leptogenys* species are not found in high numbers in collections, therefore, new taxonomic studies are usually done with a reduced number of specimens, such as singletons or small

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series from the same locality (Bolton, 1975; Lattke, 2011; Rakotonirina and Fisher, 2014; Subedi et al., 2022).

This contribution aims to improve knowledge about the *famelica* species group, proposed by Lattke (2011), which comprises five previously described species: *L. famelica* Emery, 1896, *L. pinna* Lattke, 2011, *L. phylloba* Lattke, 2011, *L. pittieri* Lattke, 2011, and *L. serrata* Lattke, 2011. We redescribe *Leptogenys famelica*, and propose a new species from South America, based on worker morphology. Finally, we gather data about their natural history and provide an illustrated identification key for these species.

Material and methods

Collections

All specimens were examined and/or deposited in the following collections:

CELC – Coleção Entomológica do Laboratório de Sistemática de Coleoptera, Universidade Federal de Viçosa, Minas Gerais, Brazil.

DZUP – Coleção Entomológica Pe. Jesus Santiago Moure, Universidade Federal do Paraná, Curitiba, Paraná, Brazil.

INPA – Instituto Nacional de Pesquisas da Amazônia, Coleção de Invertebrados, Manaus, Amazonas, Brazil.

JTLC – John T. Longino Collection, University of Utah, Salt Lake City, Utah, U.S.A.

MCSN – Museo Civico di Storia Naturale, Genova, Italy.

MPEG – Museu Paraense Emílio Goeldi, Belém, Pará, Brazil.

MZSP – Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil.

PSWC – Philip S. Ward Collection, University of California, Davis, California, U.S.A.

Measurements and indices

Most of the measurements and index definitions are adapted from Lattke (2011) and Arimoto and Yamane (2018). Specimens were measured using a Zeiss Stemi DV4 with an ocular micrometer, all measurements are in millimeters and were recorded to the 0.001 mm and rounded to the second decimal place. A spreadsheet with the individual measurements and indices for each specimen is available in Zenodo (DOI: 10.5281/zenodo.10637792).

HL - *Head length*. The distance from the midpoint of the anterior clypeal margin to the midpoint of the occipital carina, measured in full-face view.

HLL - *Head lateral length*. The head length in full-face view, measured from the mandible base to the occipital carina.

HLA - *Anterior head length*. The head length in full-face view, measured from the mandible base to the anterior edge of the compound eyes.

HW - *Head width*. Maximum width of the head measured in full-face view, excluding the compound eyes.

HvW - *Head vertexal width*. The vertex width in full face view, measured immediately anterad to the occipital carina.

CML - *Clypeal median lobe length*. The distance from the midpoint of the anterior clypeal margin to the anterior margin of the torulus, measured in full-face view.

ML - *Mandible length*. Straight line length measured from the mandible base to the apex, measured in full-face view.

EL - *Eye length*. The vertical length of the compound eyes, measured in full-face view.

SL - *Scape length*. The distance from the base to the apex of the first antennal segment, excluding the neck and basal condyle.

PrL - *Pronotum length*. The diagonal length of the pronotum in profile, measured from the anterior margin of the pronotum excluding the occipital carina to the posterior margin of the pronotum.

PrH - *Pronotum height*. The maximum height of the pronotum in profile, measured from the posterior ventral margin of the lateral surface of pronotum to the highest point of the pronotum.

PrW - *Pronotum width*. Maximum width of pronotum in dorsal view.

MeL - *Mesonotum length*. In oblique dorsal view, focused on the mesonotum, measured from anterior to posterior mesonotal margin.

MeW - *Mesonotum width*. Maximum width of the mesonotum in dorsal view.

MFL - *Metafemur length*. The distance from the base to the apex of metafemur.

WL - *Weber's length*. Diagonal length of mesosoma in lateral view, measured from the anterior margin of pronotum (excluding the occipital carina) to the posteroventral metapleural margin.

PeL - *Petiole length*. The maximum length of the petiole in profile, measured from the anteriormost margin to the posteriormost margin.

PeH - *Petiole height*. The maximum height of the petiole in profile, measured from the most ventral point of the subpetiolar process to the top of the node.

PeWA - *Anterior petiole width*. Minimum width of the node anteriorly to spiracle in dorsal view.

PeWP - *Posterior petiole width*. Maximum width of the node in dorsal view.

CI - *Cephalic index*: $HW/HL \times 100$

CLI - *Clypeus index*: $CML/HW \times 100$

Mal - *Mandibular index*: $ML/HW \times 100$

OI - *Ocular index*: $EL/HW \times 100$

SI - *Scape index*: $SL/HW \times 100$

MeI - *Mesonotal index*: $MeW/MeL \times 100$

LPI - *Lateral petiole index*: $PeH/PeL \times 100$

DPI - *Dorsal petiole index*: $PeWP/PeL \times 100$

Species imaging and mapping

High-resolution images were taken with a Leica M205 C (Leica Application Suite Version 4.12.0 [Build 86]). Full-face views of the head, profile of mesosoma and petiole, and dorsal views of mesosoma, mesonotum, and petiole were made for each species. All images were treated with Photoshop CC 2021 (Adobe).

Distribution maps were made with QGIS 3.32.2, and for the occurrence points we used information from the examined material, records from Lattke (2011), and the locations of imaged specimens on AntWeb (2024). In the case of specimens without geographical coordinates included in the labels, we used the central point of the smallest locality defined on the label for defining the approximate coordinates.

Species boundaries

We consider that species are sexually reproducing populations that can separate with intrinsic reproductive barriers (Mayr, 1963). These reproductive barriers may indirectly promote morphological disparities and, consequently, our proposal of new species is based on external morphology. Unfortunately, we had a relatively small number of specimens to document and understand possible geographical variation.

Morphology

All specimens were analyzed using an Olympus VM stereoscopic (VTM - 1x, 4x). Most morphological terms used in this work are based

on Lattke (2011). For specific terms, we used: Delsinne et al. (2019) for the head area; Harris (1979) for sculpture; Rakotonirina and Fisher (2014) to define pilosity.

Taxonomy

Leptogenys famelica Emery, 1896 (Fig. 1)

Leptogenys famelica Emery, 1896: 91, fig. 6a-c (w.) Costa Rica, Suerre at Jiménez, VII.1895, A. Alfaro [MCSN].

Worker diagnosis

Elongate and mostly punctate head, with longitudinal sulcus between frontal lobes surpassing posterior edge of compound eyes; protuberant compound eyes; mesosoma with deep median groove, smooth and shining pronotum, rest of mesosoma transversally striate, in dorsal view; elongate triangular petiolar node, anterodorsal margin with abrupt angle anteriorly to petiolar spiracle in lateral view.

Worker measurements

(N=4). HL: 2.32–2.36; HLL: 1.86–1.92; HLA: 0.53–0.62; HW: 1.58–1.61; HvW: 0.81–0.84; CML: 0.50–0.62; ML: 1.12–1.21; EL: 0.50–0.51; SL: 3.65–3.70; PrL: 1.61–1.64; PrH: 1.18–1.24; PrW: 1.49–1.52; MeL: 0.59–0.70; MeW: 0.74–0.77; MFL: 4.65–4.70; WL: 4.50–4.80; PeL: 1.83–1.86; PeH: 1.27–1.30; PeWA: 0.37–0.40; PeWP: 0.93–0.96; CI: 66.94–68.70; Mal: 70.88–76.58; CLI: 31.05–39.24; OI: 31.05–31.64; SI: 229.81–234.17; Mel: 107.14–125.42; LPI: 68.27–69.89; DPI: 50.27–51.61.

Head. Elongate in full-face view, wider anterad than posterad; lateral cephalic margin convex; posterior cephalic margin convex; occipital carina prominent; longitudinal sulcus between frontal lobes surpasses posterior edge of compound eyes; abundant striae between compound eyes, clypeus and antennal insertion; sculpture varies from striate to weakly punctate on frons, becoming densely punctate between vertex and temple; malar area weakly punctate to striate when approaching mandible; gena smooth and shining to weakly punctate; post gena mostly smooth and shining, sometimes with weak transverse striae. **Mandible:** triangular; basal margin shuts tight against clypeus; masticatory margin concave, usually with six or seven denticles; dorsal mandibular surface with weak and longitudinal striae. **Clypeus:** median

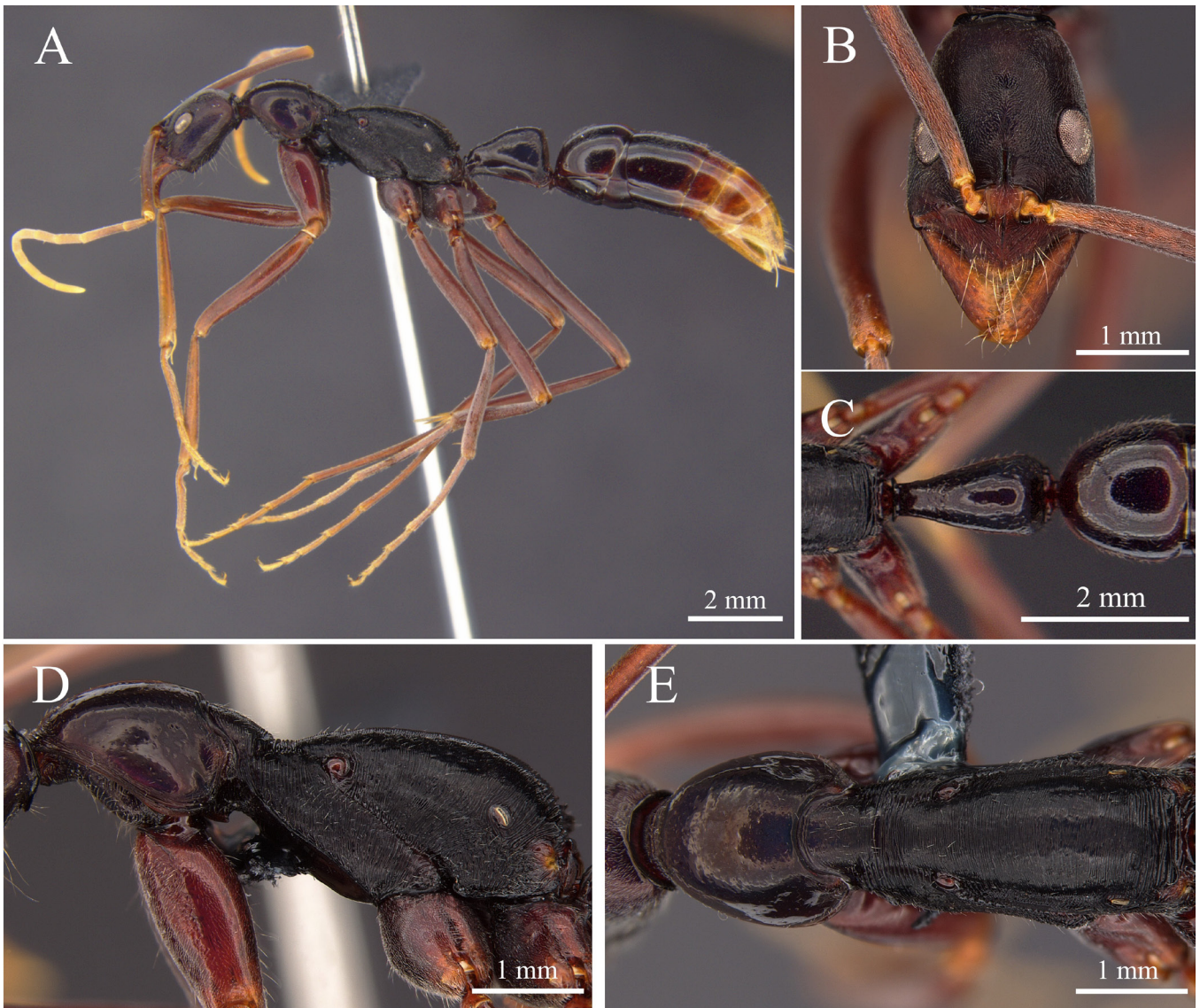


Figure 1 *Leptogenys famelica* worker, DZUP – DZUP549346: (A) body in lateral view; (B) head in full-face view; (C) petiole in dorsal view; (D) mesosoma in lateral view; (E) mesosoma in dorsal view.

lobe broadly triangular, pointed, bordered anterad by translucent lamella; lateral clypeal margin almost straight; clypeal surface obliquely to longitudinally striate. *Antenna*: scape with abundant decumbent pilosity and densely punctulate, surpasses posterior cephalic margin by over half its length; third antennal article length over 6x its apical width; second and fourth antennal articles longer than half length of third article. *Compound eye*: protuberant, convex, ventral ocular perimeter visible in cephalic full-face view; situated dorsolaterally approximately at mid-length of lateral cephalic margin; its diameter one-fourth length of lateral cephalic margin.

Mesosoma. Mesosoma in lateral view with dorsal margin forming two distinct convexities separated by broad metanotal groove. *Pronotum*: mostly smooth and shining with scattered punctae. *Propleuron*: slightly striate anterad and with a median carina. *Mesonotum*: wider than long; mostly with fine transverse striae, thicker posteriorly. *Mesopleuron*: with distinct anteroventral carina, shaped variously as crest to blunt tooth, sculpture vertically and strongly striate; ventral portion with anteromedian, longitudinal keel-like process, with blunt posterior tooth in lateral view, sculpture mostly smooth and shining, and transversely striate closed to mesopleural lobe; mesometapleural suture scrobiculate. *Mesometanotal suture*: distinct. *Propodeum*: propodeum rounded, without lateral lobes and teeth; spiracle slit-shaped slightly elevated, and posterolaterally located; propodeum transversely striate.

Metasoma. *Petiole*: elongate and triangular in lateral view, with prominent anterior carina; anterodorsal margin of petiolar node with abrupt angle anteriorly to petiolar spiracle in lateral view; smooth transition between dorsal and posterior margins; posterior margin perpendicular and slightly convex; subpetiolar process shaped as triangular lobe; posterior half of petiole increasing in width in dorsal view; node surface smooth and shining, finely striate between lateral and posterior faces. *Gaster*: anterodorsal margin of gaster convex in lateral view; constriction between abdominal segments III and IV weak; gaster sculpture smooth and shining with scattered punctulae.

Pilosity/Setation. Body predominantly with whitish or yellowish pubescence; clypeus, mandibles, head ventral surface, prosternum, coxae, subpetiolar process and posterad region of gaster with erect and suberect pilosity, usually forming angle equal to or more than 45°. Meso and metatibial apex with single setae.

Color. Head, mesosoma, petiolar node, and most of the gaster dark brown to black, possibly with bluish iridescence; antennae, mandibles, clypeus, and legs dark brown to ferruginous; posterior half of gaster ferruginous to yellowish.

Queen, male. Unknown.

Examined material. Syntype: COSTA RICA. Limón: Jiménez, Suerre, 1895, Alfaro, A., 1 worker – ANTWEB-CASENT0903967 [MCSN] (specimen studied by image available on AntWeb). **PANAMA. Cerro Azul:** 24.I.2015, Longino, J., 9.24533, -79.40209, 840m, 1 worker, – CASENT0632948 [JTLC] (specimen studied by image available on AntWeb); **Darién:** Darién National Park, 07.IV.1991, Cambra, R., 7°45'27.6"N, 77°39'03.7"W, 4w workers – DZUP549581, DZUP549346, ANTWEB1047033, ANTWEB1047019 [DZUP]. (N=6).

Leptogenys pujoli n. sp.
(Fig. 2)

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Worker diagnosis

Elongate and mostly punctate head, with longitudinal sulcus between frontal lobes not surpassing posterior edge of compound eyes; protuberant compound eyes; mesosoma without broad metanotal

groove, pronotum smooth and shining, rest of mesosoma transversally striate; elongate triangular petiolar node with straight anterodorsal margin from peduncle to summit in lateral view.

Worker measurements

(N=9). HL: 1.95–2.17; HLL: 1.58–1.78; HLA: 0.43–0.53; HW: 1.24–1.36; HvW: 0.62–0.65; CML: 0.43–0.53; ML: 0.90–1.05; EL: 0.50–0.56; SL: 3.30–3.60; PrL: 1.39–1.52; PrH: 0.99–1.08; PrW: 1.21–1.27; MeL: 0.81–0.90; MeW: 0.53–0.62; MFL: 4.30–4.75; WL: 4.20–4.60; PeL: 1.58–1.80; PeH: 0.96–1.08; PeWA: 0.22–0.28; PeWP: 0.71–0.77; Cl: 61.29–63.55; CLI: 33.82–41.73; Mal: 67.66–80.76; OI: 36.76–42.10; SI: 253.84–270.16; MeI: 60.91–73.80; LPI: 58.98–67.08; DPI: 41.11–46.83.

Head. Elongate in full-face view, wider anterad than posterad; lateral cephalic margin convex; posterior cephalic margin convex; occipital carina prominent; longitudinal sulcus between frontal lobes never surpassing posterior edge of compound eyes; abundant transverse or oblique striae present between compound eyes, clypeus and antennal insertion; sculpture varies from transversely striate to densely punctate between frons and vertex; temple shining with scattered punctae; malar area striate; gena shining with scattered punctae to fine striae around anterior margin of compound eyes and approaching mandible; post gena transversely striate. *Mandible*: triangular; basal margin shuts tight against clypeus; masticatory margin concave, usually with five or six denticles; dorsal mandibular surface with weak, and longitudinal striae. *Clypeus*: median clypeal lobe broadly triangular, pointed, bordered anterad by translucent lamella; lateral clypeal margin almost straight, slightly concave near base of mandible; clypeal surface with oblique to longitudinal striae. *Antenna*: scape with abundant decumbent pilosity and densely punctate, apex surpasses posterior cephalic margin by over half its length; third antennal article over 6x than its apical width; second antennal article almost half length of third segment; fourth antennal article longer than half length of third article. *Compound eye*: protuberant, strongly convex, and with ventral ocular perimeter not visible in full-face view; situated dorsolaterally approximately at mid-length of lateral cephalic margin; its diameter one-fourth length of lateral cephalic margin.

Mesosoma. Mesosoma in lateral view with sinuous dorsal margin; mesometanotal boundaries indistinct, without broad metanotal groove. *Pronotum*: mostly smooth and shining with scattered punctae. *Propleuron*: mostly smooth and shining, weakly striate anterad and with median carina. *Mesonotum*: longer than wide; usually mostly smooth and shining anterad with fine transverse striae at mid-width, transversely striate posterad, but sometimes completely striate. *Mesopleuron*: anteroventral carina little developed, shape ranging from crest to blunt tooth, sculpture transversely striate; ventral portion with anteromedian, longitudinal convex process, and with little posterior blunt tooth in lateral view, sculpture mostly shining and weakly striate, striae stronger near mesopleural lobe; mesometapleural suture scrobiculate. *Mesometanotal suture*: indistinct. *Propodeum*: propodeum rounded, without lateral lobes and teeth; spiracle slit-shaped slightly elevated, and posterolaterally located; propodeum transversely striate.

Metasoma. *Petiole*: elongate and triangular in lateral view; anterodorsal margin of petiolar node mostly straight anterior to spiracle in lateral view; smooth transition between dorsal and posterior margins; posterior margin almost straight and slightly oblique anterad; subpetiolar process shaped as triangular lobe; node increasing width in posterior half of lobe in dorsal view; node surface smooth and shining. *Gaster*: in lateral view, anterodorsal margin of gaster convex; constriction between abdominal segments III and IV weak; gastral sculpture smooth and shining with scattered punctae.

Pilosity/Setation. Body predominantly with whitish or yellowish, erect and suberect pilosity, usually in angle equal to or more than 45°;

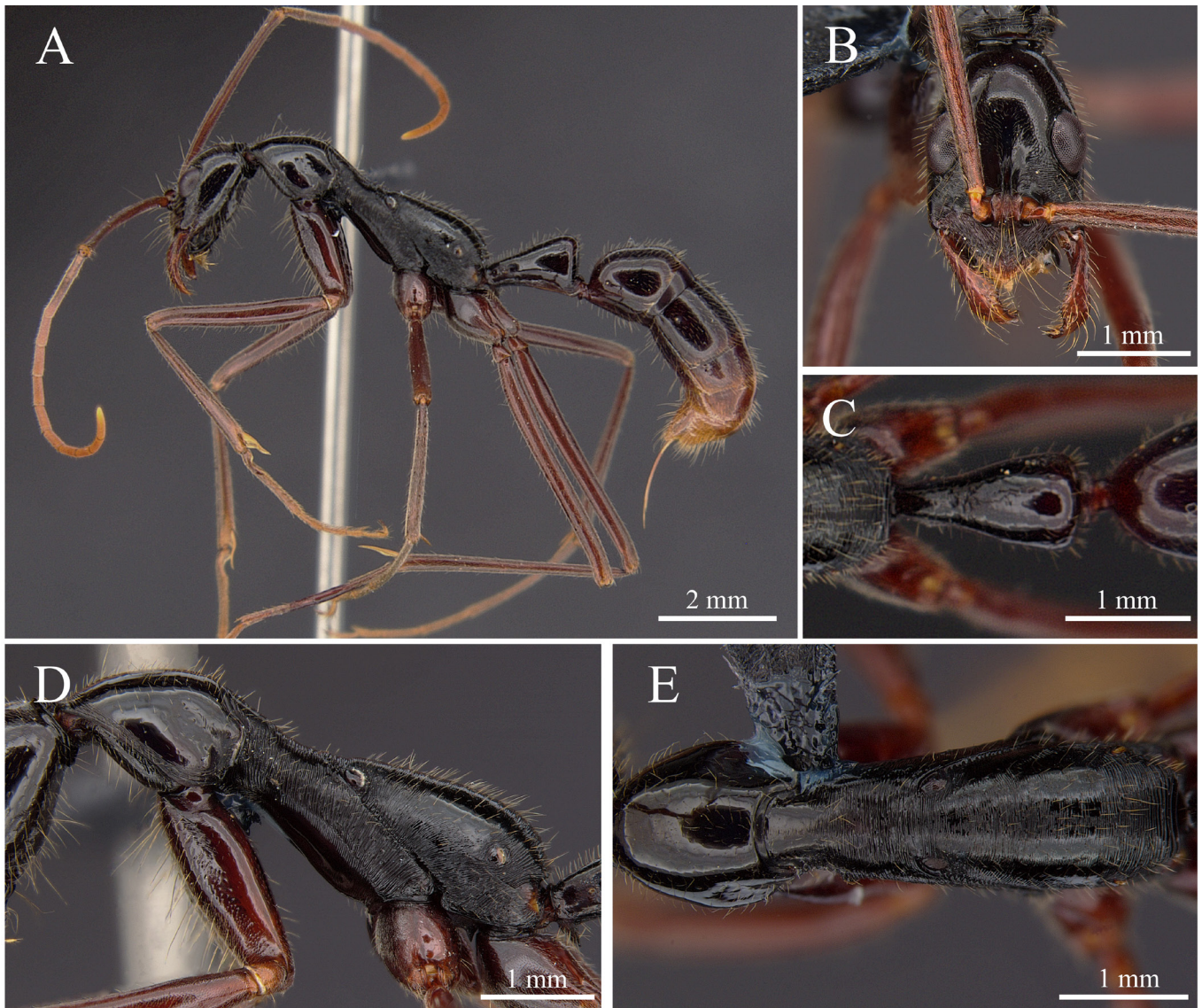


Figure 2 *Leptogenys pujoli* n. sp., holotype, DZUP – DZUP549564: (A) body in lateral view; (B) head in full-face view; (C) petiole in dorsal view; (D) mesosoma in lateral view; (E) mesosoma in dorsal view.

antennae and legs predominantly with pubescence. Meso and metatibial apex each with single setae.

Color. Head, mesosoma, petiolar node, and most of gaster dark brown almost black, sometimes with bluish iridescence; antennae, mandibles, clypeus, and legs dark brown to ferruginous; posterior half of gaster ferruginous to yellowish.

Queen, male. Unknown.

Etymology. This species is named in honor of Professor José Roberto Pujol-Luz, a dipteran taxonomist at the Universidade de Brasília (UnB). His support enabled the first author to steer his interests to the study of ant taxonomy.

Type material. **Holotype:** FRENCH GUIANA. Petit Sault: 08.VII.1998, Dejean, A., 5°03'49.4"N, 53°03'00.4"W, 1 worker – DZUP549564 [DZUP].

Paratypes: (N=5): same data as holotype, 2 workers – DZUP549683; DZUP549655 [DZUP]. **BRAZIL. Pará:** Melgaço, Caxiuanã, ECPn, IV, Transecto 2-300, pitfall 7, 6-8.II.2003, Harada, A.Y., Fagundes, E.P., Calisto, R., Calisto, R., Calafate; Mó, 1°42'23,81"S, 51°27'32,72"W, 1 worker – MPEG030445669 [MPEG]; Melgaço, Caxiuanã, ECPn, IV, Transecto 2-100, pitfall 8, 30.X.2003, Harada, A.Y., Fagundes, E.P., Ribeiro, C.J.M., Sanhudo,

C.E.D., Moura, C.A.R., Souza, J.L.P., 1°42'23,81"S, 51°27'32,72"W, 1 worker – MPEG030445671 [MPEG]; Paragominas, I-VII.2011, Solar, R., 2°59'51"S, 47°21'13"W, 85m, 1 worker – UFV-LABECOL-001240 [CELC]. (N=6).

Other material studied. BOLIVIA. Santa Cruz: Las Gamas, P.N. Noel Kempff Mercado, P.S. Ward 12284, 4.XII.1993, Ward, P.S., 14°48'S, 60°23'W, 700m, 1 worker – ANTWEB-CASENT0178806 [PSWC], (specimen studied by image available on AntWeb). **BRAZIL. Amazonas:** Manaus ZF2 – LBA (km34), winkler-10, 400, 10, 15.XI.2004, Nascimento, A. C., 02°37'27.63"S, 60°12'49.49"W, 1 worker – INPA-HYM034941 [INPA]; High Falls Rio Tarumã, #121, 30.VIII.1962, Brown, W.L., 1 worker – MZSPHYM0107188 [MZSP]; Humaitá, #80, bananeira, 23.IV.1975, da Silva, V.P., et. al., 1 worker – MZSPHYM0107189 [MZSP]; **Pará:** Porto Trombetas, manual, 24.V-27.VII.2006, Lana, T.C., 1 worker – MPEG030445668, [MPEG]; Porto Trombetas, manual, 24.V-27.VII.2006, Lana, T.C., 1 worker – MPEG030445672 [MPEG]; Melgaço, Caxiuanã, ECPn, IV, Transecto 9-100, pitfall 8, 25-27.VII.2003, Harada, A.Y., Fagundes, E.P., Ribeiro, C.J.M., Calisto, R., 1°45'15.98"S, 51°31'20.00"W, 1 worker – MPEG030445670 [MPEG]; **Rondônia:** Monte Negro, Cacaúlândia, mata na margem direita do Rio Jamari, pitfall grande, VII.2001, Favorito, S.E., 3 workers – MZSPHYM0107190, MZSPHYM0107191, MZSPHYM0107192,

[MSZP]. **FRENCH GUIANA. Petit Sault:** 08.VII. 1998, Dejean, A., 5°03'49.4"N, 53°03'00.4"W, 1 worker – DZUP549655 [DZUP]; **Saint-Laurent-du-Maroni:** Mitaraka, Maripa-Soula, winkler48h, 28.II.2015, Orivel, J., Petitclerc, F., 2.216359, -54.45698, 355m, 1 worker – ECOFOG-MI15-0174-21 [EcoFoG] (specimen studied by image available on AntWeb). (N=12).

Identification key

Additions to Lattke (2011) worker key:

33. Propodeal dorsum and pronotal disc densely punctate; petiole, in lateral view, with anterodorsal margin convex (Fig. 3B); clypeus, in frontal view, truncate anteromedially, sometimes with median denticle (Fig. 3A) *Leptogenys imperatrix*

33'. Propodeal dorsum transversely striate and pronotal disc mostly smooth and shining with scattered punctulae; petiole anteriorly narrow in lateral view (Fig. 3D); in frontal view, clypeus anteromedially pointed (Fig. 3C) 33a

33a. Head with a longitudinal sulcus between the carinae that surpasses the posterior ocular margin in full-face view (Fig. 4A); mesosoma with a distinct mesometanotal suture, in dorsal view; anterodorsal margin of petiolar node with abrupt angle anteriorly to petiolar spiracle in lateral view; (Fig.4B) *Leptogenys famelica*

33a'. Head with a longitudinal sulcus not surpassing ocular posterior margin in full-face view (Fig.4C); mesosoma without a distinct mesometanotal suture, in dorsal view; anterodorsal margin of petiolar node mostly straight anterior to spiracle in lateral view (Fig. 4D) *Leptogenys pujoli* n. sp.

Comments

In the revision of the New World *Leptogenys*, Lattke (2011) examined close to fifty specimens of what he considered to be *L. famelica*. He observed divergences in body size and sculpturing, describing them as variation between populations. Furthermore, the extensive range of *L. famelica*, was unusual for the genus in the Neotropical Region, indicating that it could be more than one species (Lattke, 2011). The study of specimens

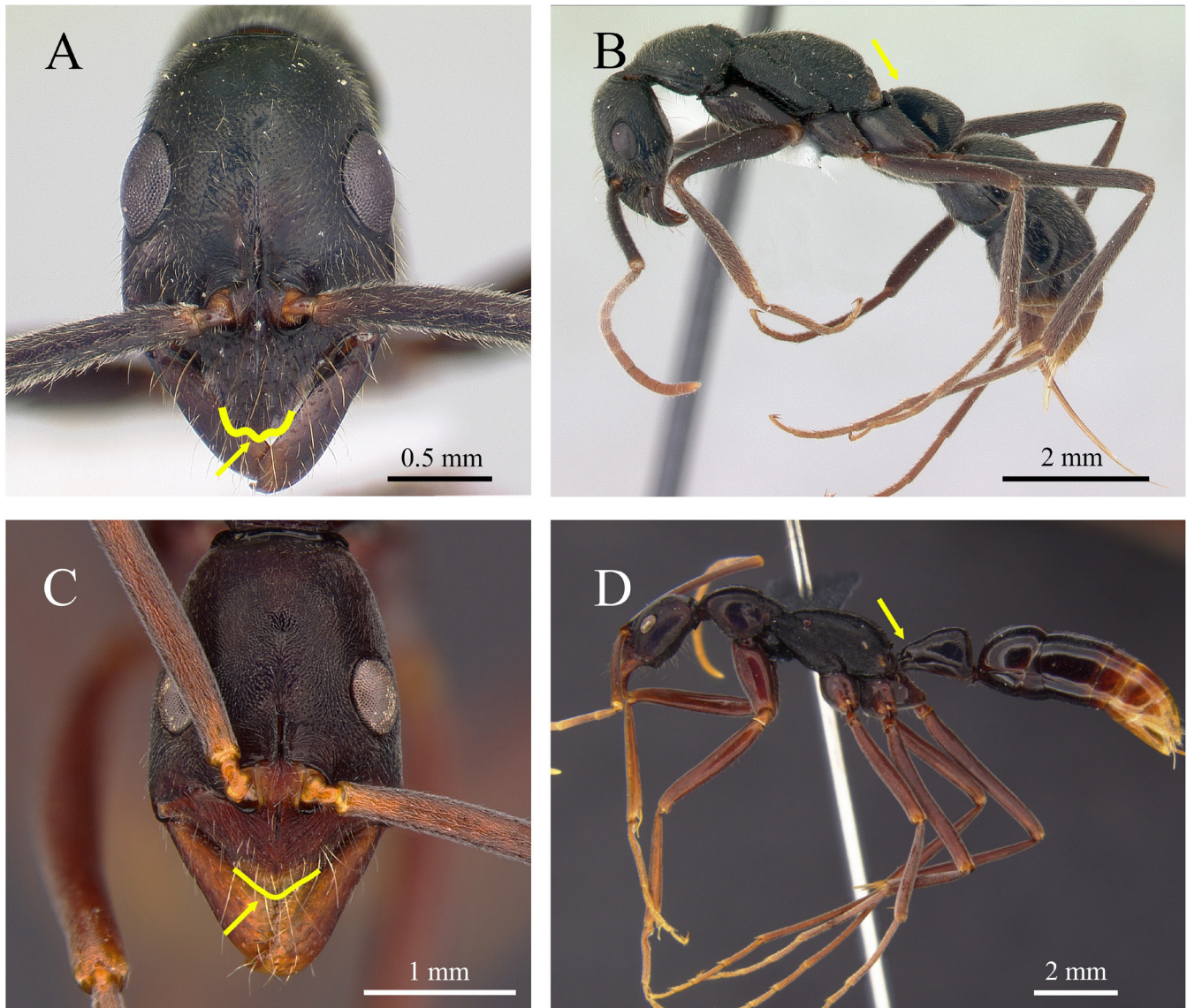


Figure 3 Head in full-face view presenting shape of clypeus, and body in lateral view presenting shape of petiole. A and B: *L. imperatrix* (Antweb specimen code: INBIOC-RI001283938). C and D: *L. famelica* (DZUP549346).

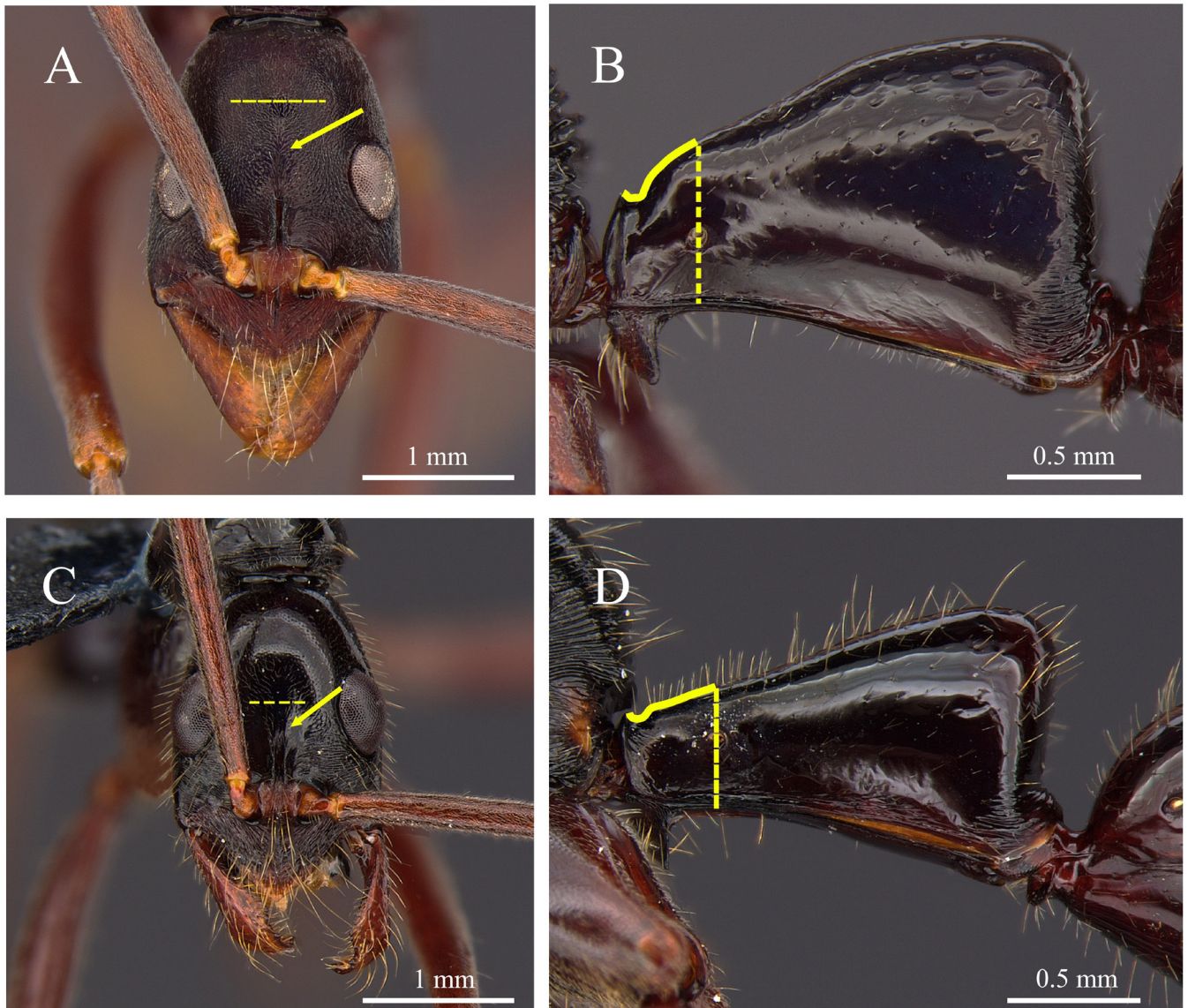


Figure 4 Head in full-face view indicating longitudinal sulcus and shape of petiole in profile. A and B: *L. famelica* (DZUP549346). C and D: *L. pujoli* n. sp., holotype (DZUP549564).

from Panama sent to us by Roberto Cambra, Universidad de Panama (UP), and additional ants from DZUP, INPA, and MZSP, permitted us to notice important and consistent morphological differences that led us to propose a new species.

Previously, the distribution of *L. famelica* was considered the largest range within all species of *Leptogenys* in the Americas, with records from Costa Rica to the center-west of Brazil (Lattke, 2011). Now, its distribution is limited to the North of the Andes Mountains, from Costa Rica to Panama, even though there are possible records from southwestern Colombia that need confirmation (Lattke, 2008, 2011). A substantial number of specimens previously recognized as *L. famelica* have now uncertain identification. Some individuals from Colombia, Ecuador, Peru, and the state of Goiás, in Brazil, with different morphologies from *L. famelica* and *L. pujoli* n. sp. were examined during the course of this work. They seem to represent potential undescribed species based on the body size, head proportions, compound eye's location, sculpture patterns and petiolar node shape, but more specimens are needed to support any conclusions. The localities for these specimens are depicted in Fig. 5.

The new species, *Leptogenys pujoli* n. sp., takes over most of the range in South America, from French Guiana to Bolivia (Fig. 5). It is smaller than *L. famelica*, one of the largest species of the genus. *Leptogenys pujoli* n. sp. can be distinguished by the longitudinal sulcus not surpassing ocular posterior margin in full-face view, the absence of mesometanotal suture in dorsal view, and the petiolar node with anterodorsal margin mostly straight anterior to spiracle in lateral view, while in *L. famelica* the longitudinal sulcus surpasses ocular posterior margin, and the petiolar node presents an abrupt angle between the peduncle and the spiracle position.

In contrast to the specialized diets expected for most species of the genus, *L. famelica* and *L. pujoli* n. sp. are, probably, generalist predators, according to field observations. In Panama, a group of six workers, previously identified as *L. cf. cuneata* Lattke, 2011 by the authors, were observed carrying an adult scorpion, *Ananteris cf. platnicki* (Miranda et al., 2021). These workers were examined by us, identified as *L. famelica*, and used for the species redescription in this paper. Also, there is a report of a worker of *L. famelica* carrying a phalangid harvestman as prey (Lattke and Longino, 2009).

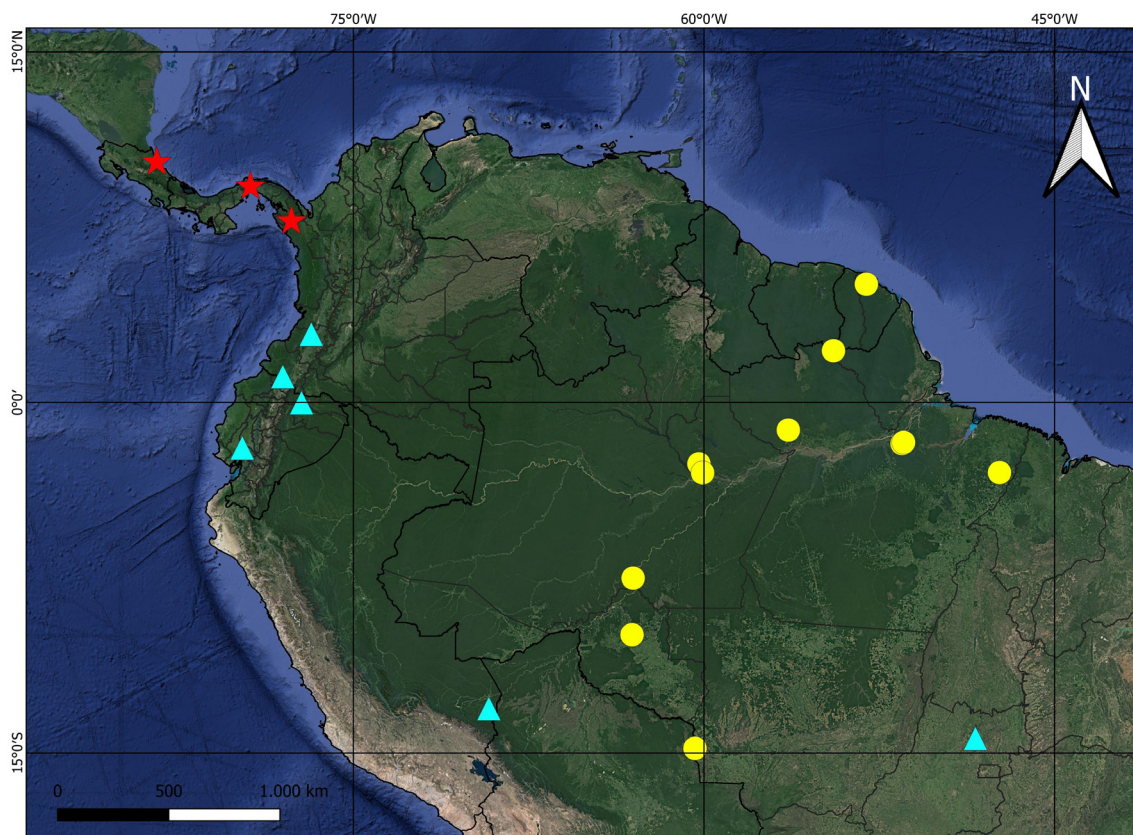


Figure 5 Distribution of species indicated by red stars for records of *Leptogenys famelica*, yellow circles for *Leptogenys pujoli* n. sp., and blue triangles for *incertae sedis* specimens.

The most frequent forms of reproduction observed in *Leptogenys* is through ergatoid queens or gamergates, implying new colonies originate by fission (Peeters, 1991). In the *famelica* species group, ergatoid queens are known for *L. pinna* and *L. pittieri*, while *L. famelica* probably presents worker reproduction, based on the high number of specimens in collections and excavated nests, and even so, there are no records of morphologically distinct queens of *L. famelica* (Lattke, 2011). For the *L. pujoli* n. sp. the same is expected, because of the same arguments used for *L. famelica* and the morphological similarity between them.

More work is necessary for understanding *famelica* species group taxonomy and ethology. We expect the presence of new species, especially in the Andean Region, given its potential for allopatric separation of populations. Males have yet to be described for these species. Furthermore, not much is known about their forms of predation and reproduction, which is why field work with a behavioral focus is needed, not only for this group of species, but for many species of *Leptogenys*.

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Conflict of Interest

The authors declare no conflicts of interest.

Author contribution statement

JPC contributed with writing, descriptions, and imaging. JEL contributed with conceptualization, editing, and review.

References

- AntWeb, 2024. AntWeb Version 8.106.1. California Academy of Science. Available in: <https://www.antweb.org> (accessed 27 March 2024).
- Arimoto, K., 2017. Taxonomy of the *Leptogenys modiglianii* species group from southeast Asia (Hymenoptera, Formicidae, Ponerinae). *ZooKeys* 651, 79-106. <http://doi.org/10.3897/zookeys.651.10336>.
- Arimoto, K., Yamane, S., 2018. Taxonomy of the *Leptogenys chalybaea* species group (Hymenoptera, Formicidae, Ponerinae) from Southeast Asia. *Asian Myrmecol.* 10, e010008. <http://doi.org/10.20362/am.010008>.
- Bakhtiar, E. Y., Chiang, S. L., 2010. *Leptogenys* ants (Hymenoptera: Formicidae: Ponerinae) of Sabah. *Serangga* 15 (1-2), 37-54.

- Bharti, H., Wachkoo, A. A., 2013. Two new species of the ant genus *Leptogenys* (Hymenoptera: Formicidae) from India, with description of a plesiomorphic ergatogyne. *Asian Myrmecol.* 5, 11-19.
- Bolton, B., 1975. A revision of the ant genus *Leptogenys* roger (Hymenoptera: Formicidae) in the Ethiopian Region. *Bull. Br. Mus. Nat. Hist. Ent.* 31 (7), 235-305. <http://doi.org/10.5962/bhl.part.29487>.
- Bolton, B., 2024. An Online Catalog of the Ants of the World. Available in: <https://antcat.org>. (accessed 27 March 2024).
- Dejean, A., Durand, J. L., Bolton, B., 1996. Ants inhabiting *Cubitermes* termitaries in African rain forests. *Biotropica* 28 (4), 701-713. <http://doi.org/10.2307/2389056>.
- Dejean, A., Evraerts, C., 1997. Predatory behavior in the Genus *Leptogenys*: a comparative study. *J. Insect Behav.* 10 (2), 177-191. <http://doi.org/10.1007/BF02765551>.
- Delsinne, T., Serna, F. J., Leponce, M., Boudinot, B. E., 2019. Capítulo 13 – Glosario de morfología. In: Fernández, F., Guerrero, R.J., Delsinne, T. (Eds.), *Hormigas de Colombia*. Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, pp. 387–458.
- Duncan, F. D., Crewe, R. M., 1994. Group hunting in a ponerine ant, *Leptogenys nitida* Smith. *Oecologia* 97 (1), 118-123. <http://doi.org/10.1007/BF00317915>.
- Eguchi, K., Viet, B. T., Yamane, S., 2014. Generic synopsis of the formicidae of Vietnam (Insecta: Hymenoptera), Part II—Cerapachyinae, Aenictinae, Dorylinae, Leptanillinae, Amblyoponinae, Ponerinae, Ectatomminae and Proceratiinae. *Zootaxa* 3860 (1), 1-46. <http://doi.org/10.11646/zootaxa.3860.1.1>.
- Fernández, F., Guerrero, R. J., 2019. Capítulo 17 - Subfamilia Ponerinae. In: Fernández, F., Guerrero, R.J., Delsinne, T. (Eds.), *Hormigas de Colombia*. Instituto de Ciencias Naturales, Universidad Nacional de Colombia, Bogotá, pp. 522–527.
- Harris, R. A., 1979. A glossary of surface sculpturing. *Occas. Pap. Entomol.* 28, 1–31.
- Heterick, B. E., 2021. A guide to the ants of Western Australia. Part I: systematics. *Rec. W. Aust. Mus. Suppl.* 86 (1), 1-245. <http://doi.org/10.18195/issn.0313-122x.86.2021.001-245>.
- Ito, F., Ohkawara, K., 2000. Production and behavior of ergatoid queens in two species of the Indonesian ponerine ant genus *Leptogenys* (*diminuta*-group) (Hymenoptera: formicidae). *Ann. Entomol. Soc. Am.* 93 (4), 869-873. [http://doi.org/10.1603/0013-8746\(2000\)093\[0869:PA BOEQ\]2.0.CO;2](http://doi.org/10.1603/0013-8746(2000)093[0869:PA BOEQ]2.0.CO;2).
- Lattke, J. 2008. El Género *Leptogenys*. In: Jiménez, E., Fernández, F., Arias, T.M., Lozano-Zambrano, F.H. (Eds.), *Sistemática, biogeografía y conservación de las hormigas cazadoras de Colombia*. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá, pp. 142–148.
- Lattke, J., Longino, J., 2009. *Leptogenys famelica* Emery, 1896. Available in: <https://ants.biology.utah.edu/genera/leptogenys/species/famelica/famelica.html> (accessed 20 December 2023).
- Lattke, J., 2011. Revision of the New World species of the genus *Leptogenys* Roger (Insecta: Hymenoptera: Formicidae: Ponerinae). *Arthropod Syst. Phylogeny* 69 (3), 127-264. <http://doi.org/10.3897/asp.69.e31744>.
- López-Muñoz, R. A., Villarreal, E., Lattke, J. E., 2018. Two new species of *Leptogenys* from southern Brazil (Hymenoptera: formicidae). *Zootaxa* 4410 (3), 559-566. <http://doi.org/10.11646/Zootaxa.4410.3.9>.
- Mayr, E., 1963. *Animal species and evolution*. Harvard University Press, Massachusetts. <http://doi.org/10.4159/harvard.9780674865327>.
- Miranda, R., de Armas, L. F., Cambra, R. A., 2021. Predation of *Ananteris* spp. (Scorpiones: Buthidae) by ants and a social wasp (Hymenoptera: Formicidae, Vespidae) in Panama, Central America. *Euscorpius* (329), 1-4.
- Peeters, C., 1991. The occurrence of sexual reproduction among ant workers. *Biol. J. Linn. Soc. Lond.* 44 (2), 141-152. <http://doi.org/10.1111/j.1095-8312.1991.tb00612.x>.
- Peeters, C., Ito, F., 2001. Colony dispersal and the evolution of queen morphology in social hymenoptera. *Annu. Rev. Entomol.* 46 (1), 601-630. <http://doi.org/10.1146/annurev.ento.46.1.601>.
- Peeters, C., De Greef, S., 2015. Predation on large millipedes and self-assembling chains in *Leptogenys* ants from Cambodia. *Insectes Soc.* 62 (4), 471-477. <http://doi.org/10.1007/s00040-015-0426-2>.
- Rakotonirina, J. C., Fisher, B. L., 2014. Revision of the Malagasy ponerine ants of the genus *Leptogenys* Roger (Hymenoptera: formicidae). *Zootaxa* 3836 (1), 1-163. <http://doi.org/10.11646/zootaxa.3836.1.1>.
- Ramage, T., Jouault, C., Schmidt, A. R., Seyfullah, L. J., Perrichot, V., 2019. Two new ant species (Formicidae: Dorylinae, Ponerinae) from New Caledonia. *Eur. J. Taxon.* 589 (589), 1-14. <http://doi.org/10.5852/ejt.2019.589>.
- Schmidt, C. A., Shattuck, S. O., 2014. The higher classification of the ant subfamily Ponerinae (Hymenoptera: Formicidae), with a review of ponerinae ecology and behavior. *Zootaxa* 3817 (1), 1-242. <http://doi.org/10.11646/zootaxa.3817.1.1>.
- Sharaf, M. R., Akbar, S. A., Al Dhafer, H. M., Aldawood, A. S., 2017. A new ant species of the *Leptogenys* sulcinoda-group (Hymenoptera: Formicidae) from Saudi Arabia. *Zool. Middle East* 63 (1), 68-75. <http://doi.org/10.1080/09397140.2017.1292645>.
- Subedi, I. P., Budha, P. B., Yamane, S., 2022. Ants of the genus *Leptogenys* Roger, 1861 (Hymenoptera: Formicidae, Ponerinae) from Nepal. *Far East. Entomol.* 448, 11-20. <http://doi.org/10.25221/fee.448.2>.
- Tozetto, L., Chaul, J. C. M., Boudinot, B. E., Lattke, J. E., 2022. Review of the *Leptogenys unistimulosa* species group (Hymenoptera: Formicidae) with the description of a new Amazonian species. *Rev. Bras. Entomol.* 66 (3), 1-17. <https://doi.org/10.1590/1806-9665-RBENT-2022-0045v>.
- Wachkoo, A. A., Maqbool, A., Akbar, S. A., Sharaf, M. R., 2018. A new species of the ant genus *Leptogenys* Roger, 1861 (Hymenoptera: Formicidae) from India. *Biodivers. Data J.* 6, e25016. <http://doi.org/10.3897/BDJ.6.e25016>.
- Ward, P. S. 1989. Genetic and social changes associated with ant speciation. In: Breed, M.D., Page Junior, R.E. (Eds.), *The Genetics of Social Evolution*. Routledge Press, New York, pp. 123–148. <http://doi.org/10.1201/9780429311239>.
- Witte, V., Maschwitz, U., 2000. Raiding and emigration dynamics in the ponerine army ant *Leptogenys distinguenda* (Hymenoptera, Formicidae). *Insectes Soc.* 47 (1), 76-83. <http://doi.org/10.1007/s000400050012>.
- Xu, Z. H., He, Q. J., 2015. Taxonomic review of the ponerine ant genus *Leptogenys* Roger, 1861 (Hymenoptera: Formicidae) with a key to the Oriental species. *Myrmecol. News* 21, 137-161.
- Zhou, S. Y., 2012. Two new species of the genus *Leptogenys* from Guangxi, China (Hymenoptera: formicidae). *Sociobiology* 59 (3), 885-892.