

New species of Central American *Rhopalothrix* Mayr, 1870 (Hymenoptera, Formicidae)

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Abstract

The ant genus *Rhopalothrix* is a rare inhabitant of wet forest leaf litter and soil. We propose a monophyletic *R. isthmica* clade that is restricted to the Neotropics, contains most of the species in the genus, and has its center of abundance and diversity in Central America. Thirteen species are recognized in the *R. isthmica* clade, of which eight are described as new and three are redescribed. A key to species in the *R. isthmica* clade is provided, and the following eight new species are described: *R. andersoni* Longino & Boudinot, **sp. nov.**, *R. apertor* Longino & Boudinot, **sp. nov.**, *R. atitlanica* Longino & Boudinot, **sp. nov.**, *R. megisthmica* Longino & Boudinot, **sp. nov.**, *R. nubilosa* Longino & Boudinot, **sp. nov.**, *R. subspatulata* Longino & Boudinot, **sp. nov.**, *R. therion* Longino & Boudinot, **sp. nov.**, and *R. triumphalis* Longino & Boudinot, **sp. nov.**. Queens are newly associated with workers for three Central American species. New synonymy is proposed for *Rhopalothrix plaumanni* Brown & Kempf, 1960 = *R. acutipilis* Kempf, 1962, **syn. nov.**

Key words: biodiversity, taxonomy, Myrmicinae, Basicerotini, wing venation

Introduction

The rotten wood and leaf litter of tropical wet forest floors are abundantly inhabited by a diversity of tiny predaceous ants in the tribes Dacetini and Basicerotini. *Rhopalothrix* Mayr, 1870 is one of the rarer and more distinctive basicerotine genera. While most basicerotines have triangular mandibles, *Rhopalothrix* mandibles are arched shafts with an apical fork similar to many dacetines. The last complete revision of the genus was by Brown & Kempf (1960). At that time a total of 12 specimens in eight species was known. Seven species were Neotropical and one was from New Guinea. Taylor (1968) added an Australian species. Recent inventories of litter arthropods in Central America have yielded over 300 specimens, greatly clarifying diversity patterns and species boundaries in that region. Here we provide a revised taxonomy of the genus, bringing the total to 16 species in the genus.

Baroni Urbani & de Andrade (2007) proposed a synonymization of the tribe Basicerotini with the Dacetini and that all basicerotine genera, including the genus *Rhopalothrix*, be placed in the single genus *Basiceros* Schulz, 1906. This was an incorrect synonymization, because *Rhopalothrix* Mayr, 1870 has priority over *Basiceros* Schulz, 1906 (*Basiceros* was a replacement name for the homonym *Ceratobasis* Smith, 1860). Baroni Urbani & de Andrade's concept of *Rhopalothrix* (assuming the nomenclatural correction) is much broader than the one we adopt here. There is currently variable acceptance of Baroni Urbani & de Andrade's reclassification, and it is clear that a larger study that incorporates morphological and molecular data will be necessary before genus boundaries within the tribe are understood. The main purpose of this paper is to describe new species from Central America, not to redefine genus boundaries, and we follow the classification of Brown & Kempf (1960) and Bolton (2003).

Among the *Rhopalothrix* species, we propose a monophyletic *R. isthmica* clade with the following synapomorphies: (1) absence of squamiform setae on the face, and (2) development of shallow arcuate grooves and ridges on the face. All the species share a similar habitus, being small, nearly eyeless, pale brown, with uniformly matte surface, and a characteristically broad, lumpy face. The *R. isthmica* clade is strictly Neotropical, with the greatest abundance and diversity in Central America. The only *Rhopalothrix* species outside of the *R. isthmica* clade are *R. ciliata* from Colombia, *R. diadema* from New Guinea, and *R. orbis* from Australia. These latter three species all have squamiform setae on the face and their heads are more elongate and less flattened, more like other basicerotines.

Biology

Knowledge of the biology of the *R. isthmica* clade of *Rhopalothrix* is conjectural; a nest has never been recovered and a live specimen never seen. What we know is based on locations and frequencies of capture using various mass-sampling methods. Specimens are known from wet to moderately seasonal forest, from sea level to 2140 m elevation. At higher elevation, they are found in diverse mesophyll forest and in forests with various combinations of *Liquidambar* and montane oak. In Costa Rica, they are restricted to the wet forests of the Atlantic slope, to 1500 m on the Barva Transect in the Cordillera Volcánica Central and to 800 m in the Cordillera de Tilarán. The genus is unknown from the Monteverde cloud forest at 1500 m, the lowland wet forests of the Osa Peninsula, and the lowland tropical dry forests of Guanacaste, in spite of intensive collecting efforts in these areas. Further north in Central America they can occur at higher elevations.

In quantitative sampling at La Selva Biological Station, in the Atlantic lowlands of Costa Rica, occurrences were relatively more frequent in soil/litter cores than in samples of sifted litter from the soil surface. This suggests that nests are subterranean, with workers only occasionally venturing up into the litter layer. Dealate queens are known for a few species, occurring occasionally in Winkler or Berlese samples. Alate queens of one La Selva species were found in canopy fogging samples, one each in two separate fogging events. Oddly, alate queens have not been found in the many Malaise samples from La Selva. Males remain unknown.

Characters

Species of the *R. isthmica* clade vary in size, armature of the mandible, shape of the labrum, shape of the propodeal tooth and infradental lamella, and the distribution and abundance of squamiform setae on the gaster. Size is

measured as head width (HW), the maximum width of the head capsule in full-face view. There was little variation in allometry among traditional metric characters (head length, scape length, mesosoma length, etc.), obviating the need for extensive measurements. The inner surface of the mandible curves through the masticatory margin and has a variable number of teeth or small denticles (Fig. 1). The apical fork is perpendicular to the dorsal surface of the mandible and comprises two long spiniform teeth: the subapical and apical. The subapical tooth is visible as the apparent apex of the mandible in dorsal view; the shorter apical tooth is below it. There are usually two small intercalary denticles between the subapical and apical teeth. A small, usually reclinate denticle occurs on the inner base of the subapical tooth, with a diastema between it and the more basal teeth of the masticatory margin. This denticle varies in size and distinctness and may be extremely minute or absent. In one species it is pronounced and recurved, directed back toward the base of the mandible. The shape of the labrum is highly variable and of great diagnostic value (Fig. 2). In some species the apical lobes of the labrum are secondarily divided, thence bilobed; we term these the lateral and medial lobules (Fig. 2A, B). When preparing specimens, it helps to open at least one mandible by inserting an insect pin between the mandibles and labrum and wedging open a mandible. This allows clear viewing of the mandibular dentition and the labrum.

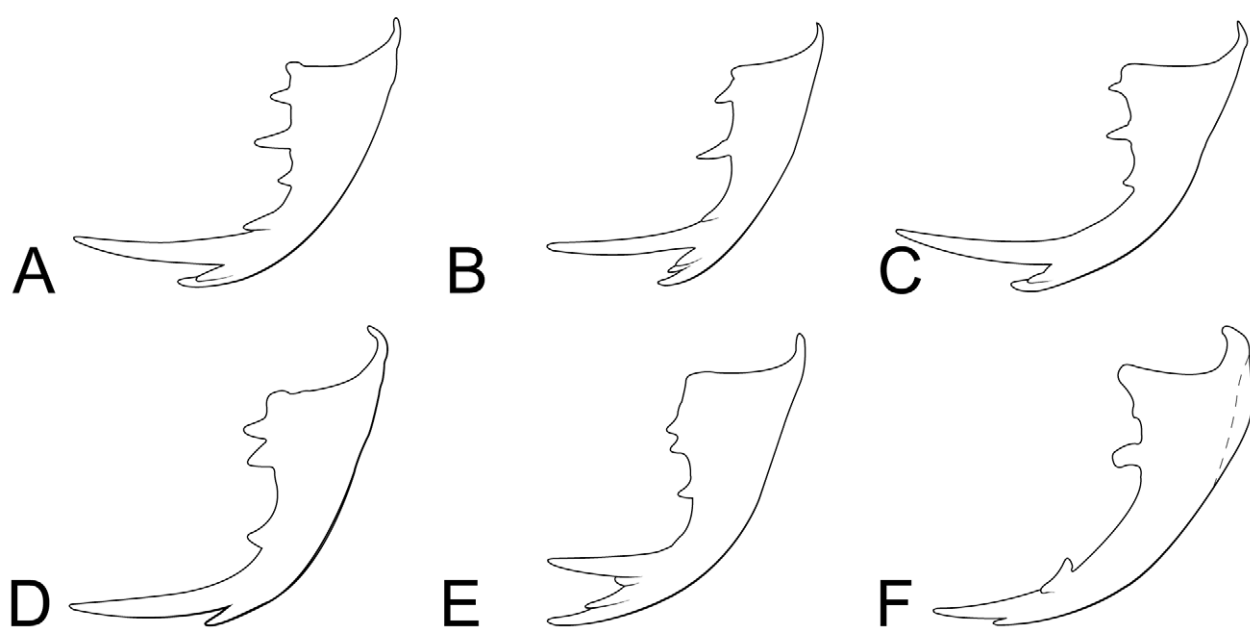


FIGURE 1. Diagrammatic representation of *Rhopalothrix* mandibles. **A.** *R. andersoni*, *R. isthmica*, *R. megisthmica* (part), *R. therion*. **B.** *R. atitlanica*, *R. megisthmica* (part), *R. triumphalis*. **C.** *R. stannardi*. **D.** *R. nubilosa*, *R. subspatulata*. **E.** *R. weberi*. **F.** *R. apertor*.

The posterior face of the propodeum always has a pair of translucent longitudinal lamellae, of varying width, and with the dorsal portion forming an obtuse, right-angle, or acute tooth. The infradental lamella is the portion of the lamella ventral to the tooth. Varying numbers of squamiform (paddle-shaped) setae occur on the gaster (Fig. 3). Setae are always present on the second through fourth gastral tergites (abdominal segments 5–7, small sclerites at the apex of the gaster). The first gastral tergite, which covers most of the gaster, varies from being devoid of setae to having a dense, even coverage. The setae vary in the length of the stem and the degree of inclination. The meso- and metabasitarsus and the apices of the tibiae also have squamiform setae varying in number and size.

Wing venation terminology: we follow Yoshimura & Fisher (2012) for vein and cell names and Mason (1986) for vein development terms (fig. 4). With respect to the latter, tubular veins are those which are sclerotized and raised on both the ventral and dorsal surfaces, while the sclerotized nebulous veins and unsclerotized spectral veins are raised on the dorsal surface only. For membrane terminology, we follow Snodgrass (1935): the region of the wing anterad the vannal fold is termed the remigium, while the region posterad the vannal fold is termed the vannus.

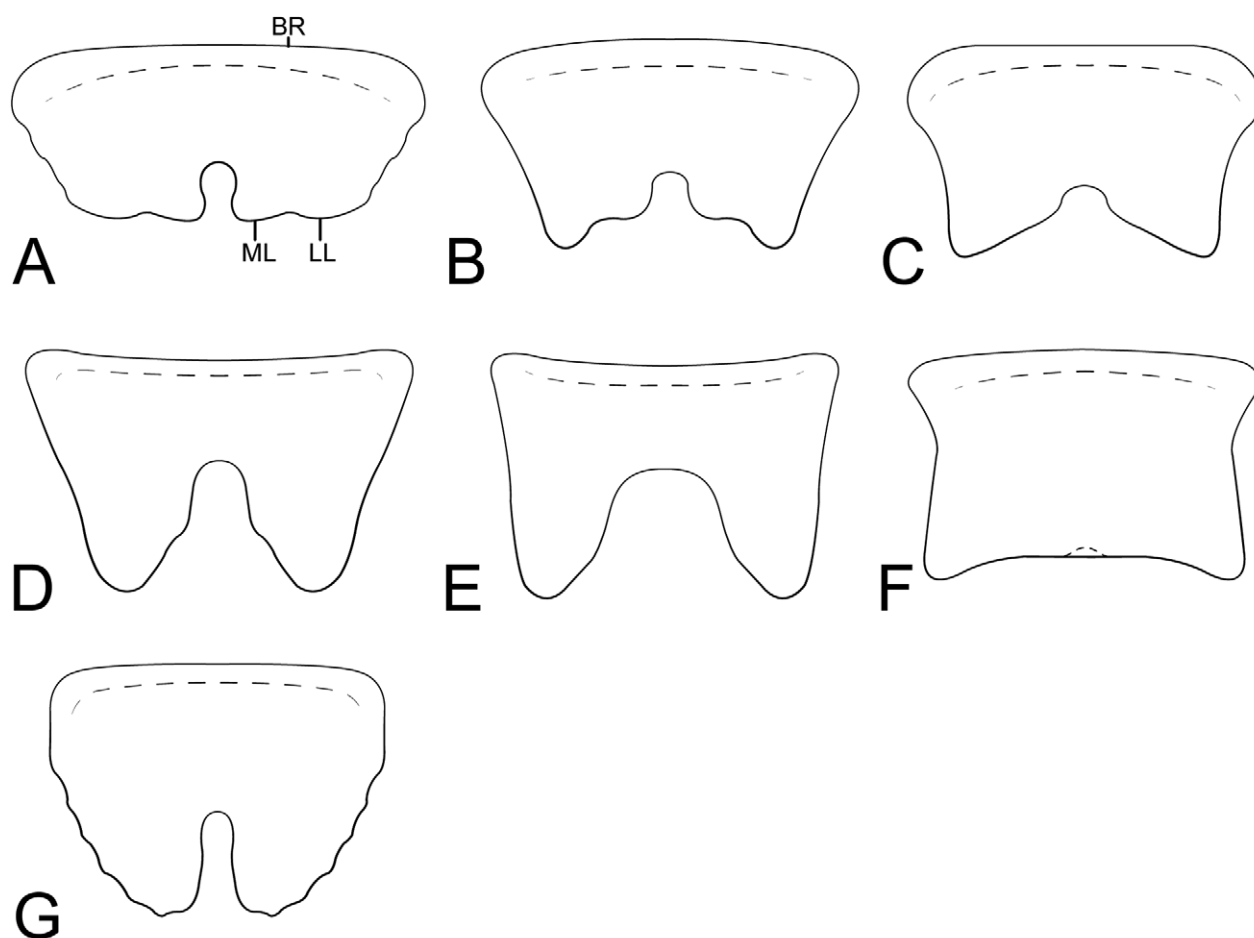


FIGURE 2. Diagrammatic representation of *Rhopalothrix* labra. **A.** *R. therion*. **B.** *R. andersoni*, *R. atitlanica*, *R. triumphalis*. **C.** *R. isthmica*, *R. megisthmica*. **D.** *R. nubilosa*, *R. subspatulata*. **E.** *R. weberi*. **F.** *R. stannardi*. **G.** *R. apertor*. BR: basal ridge. LL: lateral lobule. ML: medial lobule.

Methods

Observations were made at $63\times$ magnification with a Leica MZ12.5 dissecting microscope. Measurements were made with a dual-axis micrometer stage with output in increments of 0.001 mm. However, variation in specimen orientation, alignment of crosshairs with edges of structures, and interpretation of structure boundaries resulted in measurement accuracy to the nearest 0.01 mm. All measurements are presented in mm.

All holotypes and paratypes associated with the new species described here have unique specimen-level identifiers ("specimen codes") affixed to each pin. Specimen codes should not be confused with collection codes, which are associated with particular collection events. When reported, collection codes follow the collector. Specimen collection data are derived from a specimen database and are not direct transcriptions of labels. Latitudes and longitudes are reported in decimal degrees, as a precise point (five decimal places) followed by an error term in meters. Images of holotypes, distribution maps, and all specimen data on which this paper is based are available on AntWeb (AntWeb 2012).

Repositories

Collections are referred to by the following acronyms, which follow the Insect and Spider Collections of the World website (Evenhuis 2012):

CAS:	California Academy of Sciences, San Francisco, CA, USA.
EAPZ:	Escuela Agrícola Panamericana, Tegucigalpa, Honduras.
ECOSCE:	Colección Entomológica de El Colegio de la Frontera Sur, San Cristóbal, Chiapas, Mexico.
IFML:	Instituto Fundación Miguel Lillo, Tucumán, Argentina.
INBio:	Instituto Nacional de Biodiversidad, Costa Rica.
JTLC:	John T. Longino, personal collection, University of Utah, Salt Lake City, UT, USA.
LACM:	Los Angeles County Museum of Natural History, Los Angeles, CA, USA.
MCZC:	Museum of Comparative Zoology, Cambridge, MA, USA.
NMW:	Naturhistorisches Museum, Vienna, Austria.
UNAM:	Universidad Nacional Autónoma de México, México D. F., México.
USNM:	National Museum of Natural History, Washington, DC, USA.
UVGC:	Colección de Artrópodos, Universidad del Valle de Guatemala, Guatemala City, Guatemala.

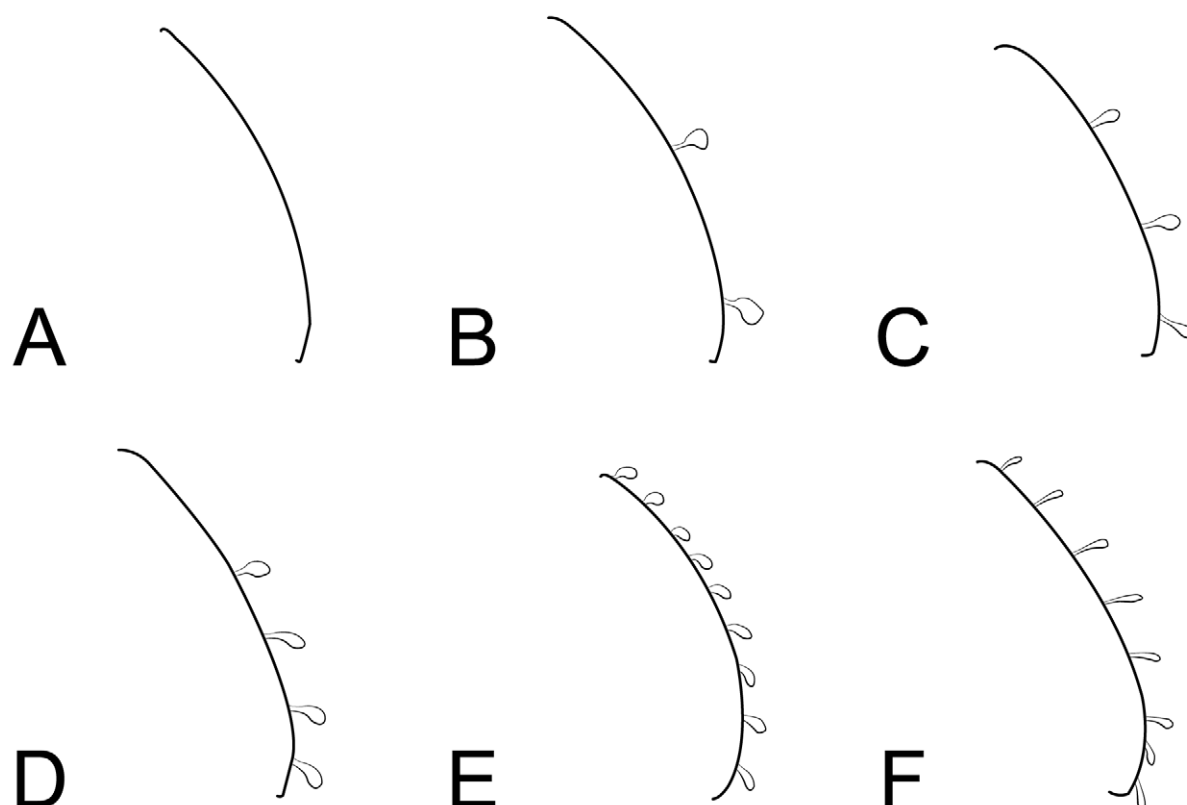


FIGURE 3. Diagrammatic representation of the first gastral tergite of *Rhopalothrix*, showing approximate disposition and shape of setae down the midline in profile view. **A.** *R. apertor*, *R. plaumanni*. **B.** *R. subspatulata*. **C.** *R. nubilosa*, *R. weberi*. **D.** *R. isthmica*, *R. stannardi*. **E.** *R. atitlanica*, *R. therion*. **F.** *R. andersoni*, *R. megisthmica*, *R. triumphalis*.

Synopsis of the genus *Rhopalothrix* Mayr, 1870

Rhopalothrix Mayr, 1870: 415. Type-species *Rhopalothrix ciliata* Mayr, 1870, by subsequent designation of Wheeler 1911: 172.

Rhopalothrix in Myrmicidae, Cryptoceridae: Emery 1877: 81.

Rhopalothrix in Myrmicinae: Dalla Torre 1893: 145.

Rhopalothrix in Cryptoceridae, Dacetini: Ashmead 1905: 384.

Rhopalothrix in Myrmicinae, Dacetini: Forel 1892: 344; 1893: 164; 1895: 133; Emery 1895: 770; Forel 1899: 41; Wheeler 1910: 141; Emery 1914: 42; Forel 1917: 246; Wheeler 1922: 666; Emery 1924: 328; Donisthorpe 1943: 724; Brown 1948: 102; Chapman & Capco 1951: 105; Baroni Urbani & De Andrade 1994: 32; Baroni Urbani & De Andrade 2007: 88 (as junior synonym of *Basicros* Schulz, 1906).

Rhopalothrix in Myrmicinae, Basicerotini: Brown 1949: 92; Brown & Kempf 1960: 230; Taylor 1990: 397; Bolton 1994: 105; Bolton 1998: 67; Fernández 2003: 314; Bolton 2003: 185.

Rhopalothrix incorrectly synonymized with *Basicros* Schulz, 1906: Baroni Urbani & de Andrade 2007.

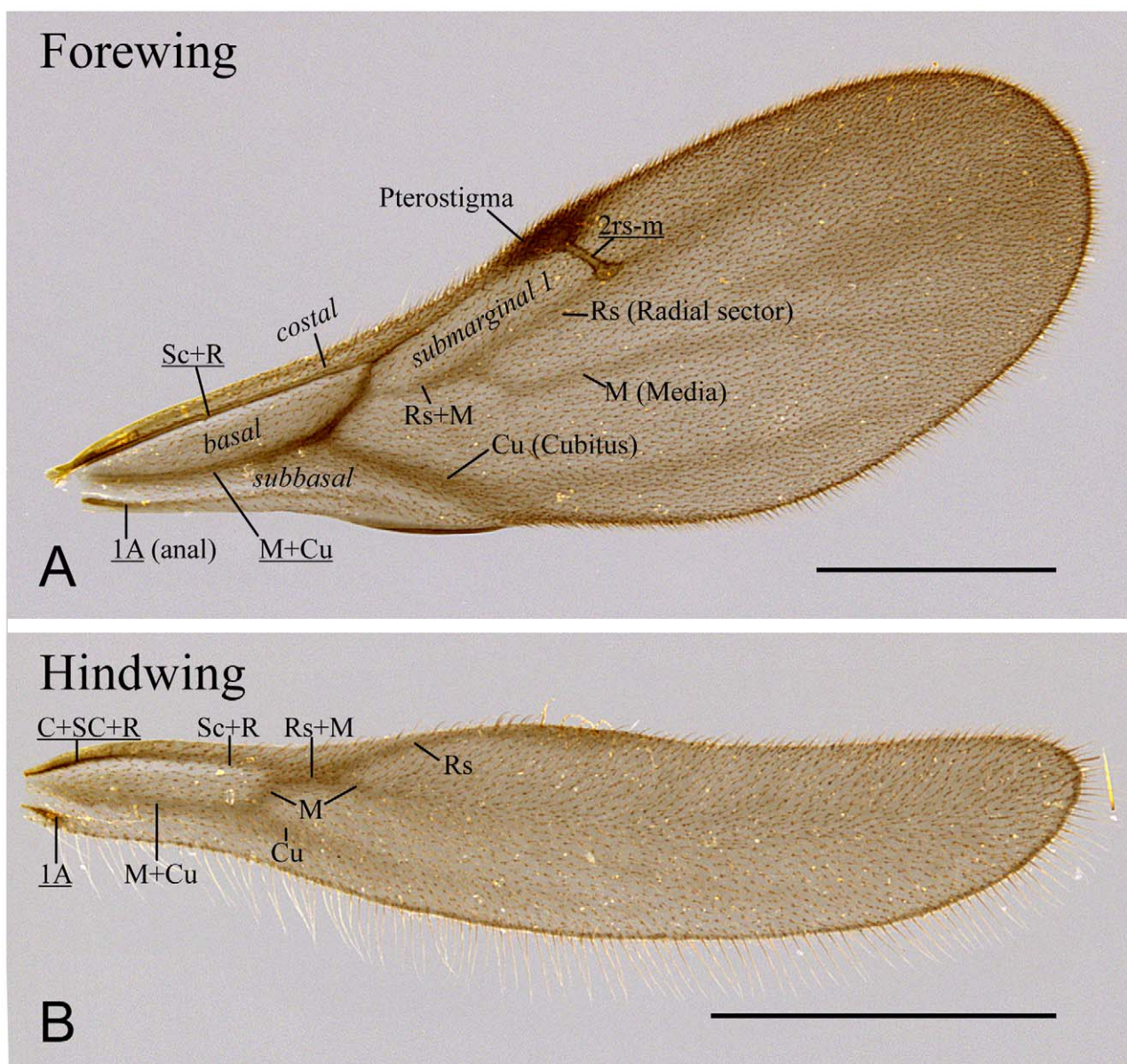


FIGURE 4. Wings of *Rhopalothrix subspatulata* **sp. nov.**, queen (Costa Rica, INBIOCRI002728337). Tubular and nebular veins are underlined, spectral veins are in regular-face, and cell names are italicized. **A.** Fore wing. **B.** Hind wing. Scale bars are 0.5 mm.

Taxonomic synopsis

Rhopalothrix isthmica clade:

Rhopalothrix andersoni Longino & Boudinot, **sp. nov.** Honduras.

Rhopalothrix apertor Longino & Boudinot, **sp. nov.** Costa Rica.

Rhopalothrix atitlanica Longino & Boudinot, **sp. nov.** Guatemala.

Rhopalothrix isthmica (Weber, 1941). Panama to Guatemala.

Rhopalothrix kusnezovi Brown & Kempf, 1960. Argentina.

Rhopalothrix megisthmica Longino & Boudinot, **sp. nov.** Guatemala, Mexico.

Rhopalothrix nubilosa Longino & Boudinot, **sp. nov.**, Costa Rica.

Rhopalothrix plaumanni Brown & Kempf, 1960. Brazil (Santa Catarina).

= *Rhopalothrix acutipilis* Kempf, 1962, **syn. nov.**

Rhopalothrix stannardi Brown & Kempf, 1960. Mexico, Guatemala.
Rhopalothrix subspatulata Longino & Boudinot, **sp. nov.**, Costa Rica, Nicaragua.
Rhopalothrix therion Longino & Boudinot, **sp. nov.**, Costa Rica to Honduras.
Rhopalothrix triumphalis Longino & Boudinot, **sp. nov.**, Mexico.
Rhopalothrix weberi Brown & Kempf, 1960. Cuba, Honduras to Mexico.

Rhopalothrix, incertae sedis:

Rhopalothrix ciliata Mayr, 1870. Colombia.
Rhopalothrix diadema Brown & Kempf, 1960. New Guinea.
Rhopalothrix orbis Taylor, 1968. Australia.

Key to the species of *Rhopalothrix isthmica* clade (workers)

Rhopalothrix kusnezovi is known from a single queen from Argentina. The worker is probably similar to *R. plaumanni*.

1. Face with conspicuous squamiform setae; Old World and Colombia (*Rhopalothrix incertae sedis*).
 *R. diadema* Brown & Kempf (New Guinea), *R. orbis* Taylor (Australia), *R. ciliata* Mayr (Colombia); not keyed further
- Face lacking large squamiform setae; Neotropics (*Rhopalothrix isthmica* clade) 2
2. First gastral tergite completely lacking squamiform setae, or at most one pair at extreme posterolateral margins of tergite (Fig. 3A). 3
- First gastral tergite with at least six squamiform setae, at least one pair mid-disk, not all restricted to posterior margin of tergite (Fig. 3B–F) 4
3. Mandible with three or more acute teeth on masticatory margin; tooth at base of subapical tooth small, reclinate, directed anteriorly; apical and subapical teeth similar in length; southern Brazil. *R. plaumanni* Brown & Kempf
- Masticatory margin of mandible with a tiny inconspicuous denticle near base and a large peg-like tooth at about one third distance from base; tooth at base of subapical tooth distinct and directed posteriorly; subapical tooth longer than apical tooth; Costa Rica (Fig. 1F) *R. apertor*
4. Labrum about as long as broad, medial sinus deep, distance from tip of labral lobe to base of sinus similar to distance from base of sinus to basal ridge (Fig. 2D,E) 5
- Labrum distinctly broader than long; distance from tip of labral lobe to base of sinus shorter than distance from base of sinus to basal ridge (Fig. 2A,B,C,F) 7
5. Denticles of masticatory margin of mandible larger (Fig. 1D); HW > 0.41; subapical tooth of mandible at least twice as long as apical tooth; Costa Rica and Nicaragua (queen of *R. subspatulata* with pronounced concavity on face medial to compound eye, and with distinct carina between eye and concavity) 6
- Denticles of masticatory margin minute (Fig. 1E); HW < 0.40; subapical tooth of mandible about the same length or only slightly longer than apical tooth; Honduras to Mexico, Cuba (queen with face more evenly convex, without pronounced concavity or carina medial to compound eye) *R. weberi* Brown & Kempf
6. First gastral tergite with four squamiform setae on posterior margin, two at mid-disk (Fig. 3B); HW < 0.50. *R. subspatulata*
- First gastral tergite with six or more squamiform setae on posterior margin, about six on disk between posterior border and mid-length (Fig. 3C); HW > 0.50 *R. nubilosa*
7. Anterior margin of labrum transverse, with at most a minute semicircular notch medially (Fig. 2F); masticatory margin of mandible with three small teeth (Fig. 1C); Guatemala and Mexico *R. stannardi* Brown & Kempf
- Anterior margin of labrum with conspicuous median notch (Fig. 2A,B,C,G); masticatory margin of mandible with two or three teeth (Fig. 1A,B) 8
8. Anterior labral lobes triangular, inner margins sloping evenly to small semicircular notch, medial lobule reduced to absent (Fig. 2C) 9
- Anterior labral lobes moderately to distinctly bilobed, not triangular, with medial lobule well developed (Fig. 2A,B) 10
9. HW 0.58–0.68; propodeal tooth a right angle or acute; metanotal groove shallowly impressed *R. isthmica* (Weber)
- HW > 0.73; propodeal tooth usually large and acute; metanotal groove moderately to deeply impressed *R. megisthmica*
10. Lateral lobule of labrum rounded, shorter than medial lobule (Fig. 2A); masticatory margin of mandible with three distinct teeth (Fig. 1A); Costa Rica to Honduras. *R. therion*
- Lateral lobule of labrum more triangular, longer than medial lobule (Fig. 2B); masticatory margin of mandible with two or three teeth (Fig. 1A,B); Honduras to Mexico 11
11. Squamiform setae of first gastral tergite more elongate in profile view, with thin stem before thickened apex (Fig. 3F); HW 0.57–0.69. 12
- Squamiform setae of first gastral tergite shorter in profile view, more abruptly thickened near attachment point to gaster (Fig. 3E); HW 0.49–0.50; Guatemala *R. atitlanica*
12. HW 0.57–0.65; masticatory margin of mandible with two teeth (Fig. 1B); propodeal tooth usually a short right angle, with

infradental lamella relatively narrow; Mexico (Chiapas) *R. triumphalis*
 - HW 0.63–0.69; masticatory margin of mandible with three teeth (Fig. 1A); propodeal tooth pronounced and acute, with infra-
 dental lamella broad and forming rounded convex lobe beneath tooth; Honduras. *R. andersoni*

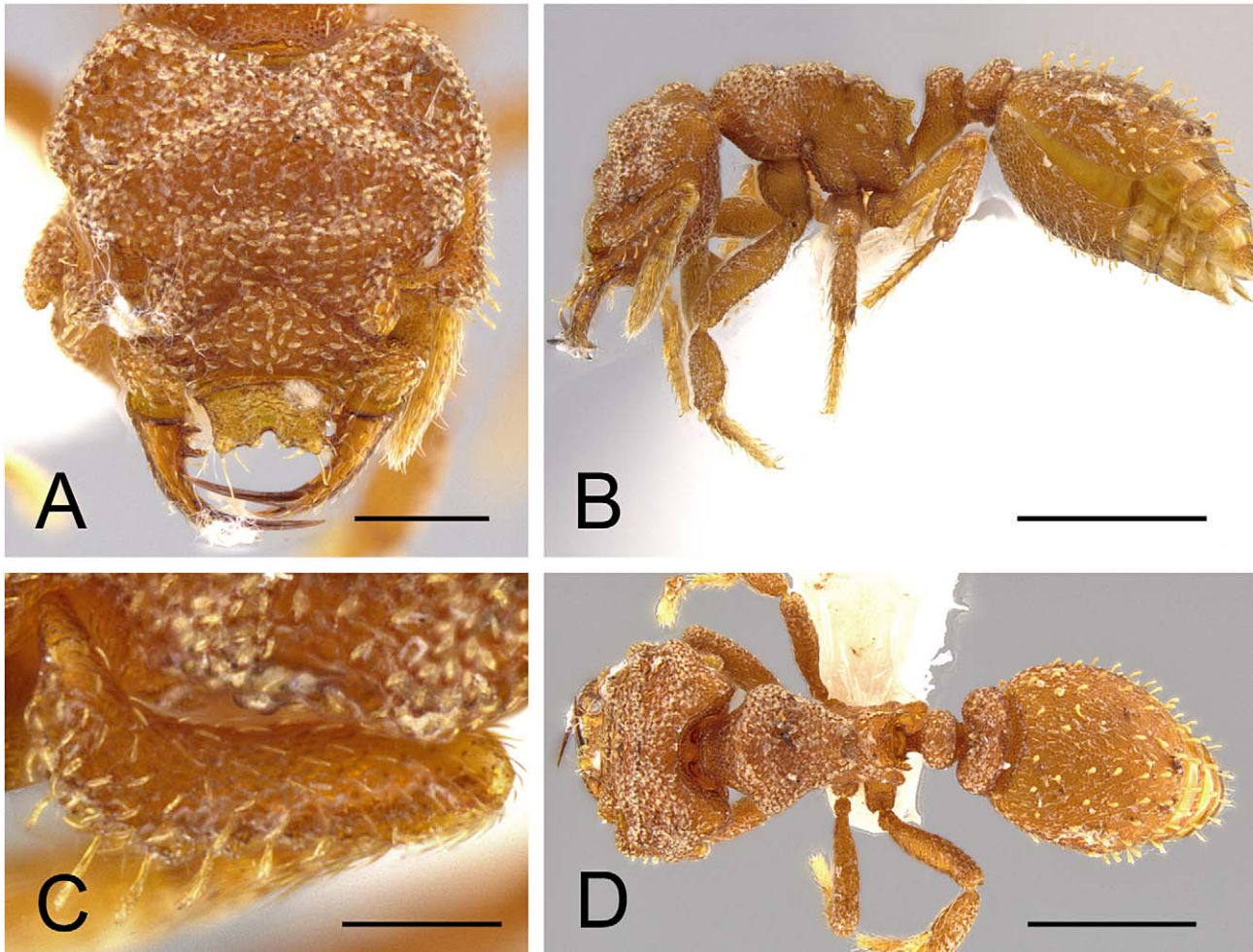


FIGURE 5. *Rhopalothrix andersoni* sp. nov., holotype worker (Honduras, CASENT0629582). **A.** Full-face view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

Species accounts

Rhopalothrix andersoni Longino & Boudinot, sp. nov.

(Figs 1A, 2B, 3F, 5, 16)

Type material. *Holotype, worker:* HONDURAS, Olancho: 9 km N Catacamas, 14.93512 -85.90739 ±20 m, 1350 m, 11 May 2010, tropical montane forest, ex sifted leaf litter (R.S.Anderson#2010-025) [CAS, unique specimen identifier CASENT0629582]. *Paratype (worker):* same data, but 14.93849 -85.90665 ±20 m, 1440 m, 10 May 2010, mixed hardwood forest, ex sifted leaf litter (R.S.Anderson#2010-022) [JTLC, CASENT0629580].

Geographic range. Honduras.

Diagnosis. Anterior labral lobe bilobed, with lateral lobule longer than medial lobule; masticatory margin of mandible with three teeth; squamiform setae of first gastral tergite abundant, short, 2 × longer than wide; HW 0.63–0.70.

Description. *Worker.* HW 0.63–0.70 (n=3); mandible with three teeth on masticatory margin, second tooth from base largest; subapical tooth with distinct reclinate denticle at base; subapical tooth about 3 × as long as apical tooth; intercalary teeth distinct, one closest to apical tooth about half as long as apical tooth; labrum trapezoidal, anterior margin bilobed, lateral lobule triangular, longer than medial lobule, medial lobules rounded, flanking semicircular median notch; arcuate promesonotal groove and metanotal groove distinctly impressed; propodeal

tooth large, acute, infradental lamella wide and forming a secondary convex lobe below tooth; squamiform setae abundant on first gastral tergite, uniformly covering entire tergite; gastral setae relatively short, $2 \times$ longer than wide, tapering evenly from apex to base.

The *queen* and *male* are unknown.

Biology. This species occurs in cloud forest, from 1300–1440 m elevation. It is known from two montane sites: Sierra de Agalta in eastern Honduras, where it is sympatric with *R. therion*, and Cusuco National Park in northwestern Honduras. The three known specimens are from Winkler samples of sifted leaf litter.

Etymology. Referring to Robert S. Anderson, coleopterist extraordinaire.

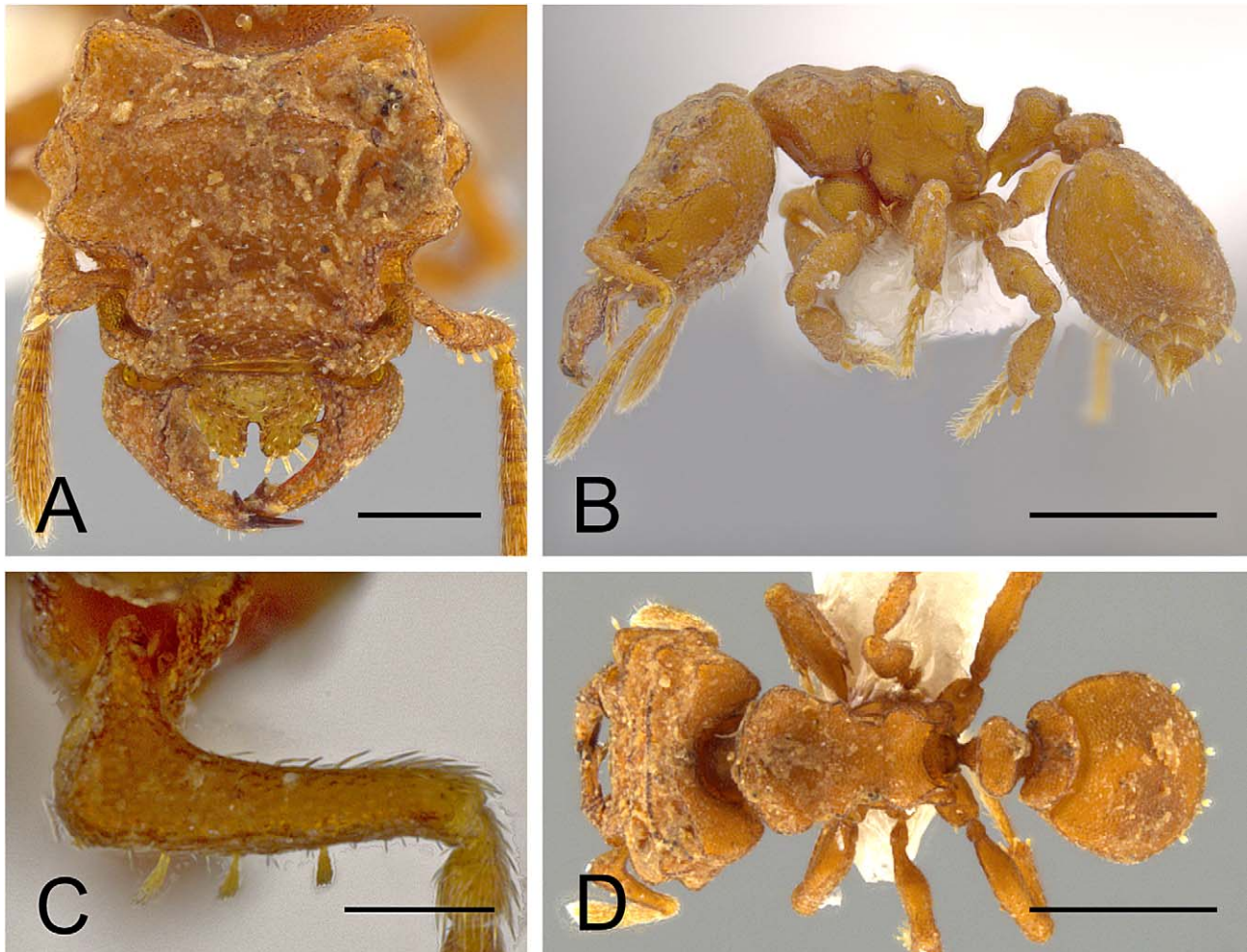


FIGURE 6. *Rhopalothrix apertor* sp. nov., holotype worker (Costa Rica, CASENT0629589). **A.** Full-face view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

***Rhopalothrix apertor* Longino & Boudinot, sp. nov.**

(Figs 1F, 2B, 3A, 6, 16)

Type material. *Holotype, worker*: COSTA RICA, Heredia: 7 km SW Pto Viejo, 10.40389 -84.03944 \pm 500 m, 160 m, 4 Mar 2005, mature wet forest, ex sifted leaf litter (TEAM#AMI-2-W-033-01) [CAS, unique specimen identifier CASENT0629589]. *Paratypes* (workers): same data as holotype [USNM, CASENT0629588; MCZC, INB0003667720].

Geographic range. Costa Rica.

Diagnosis. Masticatory margin of mandible dominated by a single, blunt, peg-like tooth; tooth at base of subapical tooth, instead of being the small reclinate denticle typical of other species, is a distinct recurved tooth, directed posteriorly; first gastral tergite largely devoid of setae, with one pair of squamiform setae at posterolateral margins; first gastral sternite with pronounced median keel, this keel weak to absent in other species.

Description. *Worker.* HW 0.54–0.74 (n=6); masticatory margin of mandible with single large blunt, in some almost capitate, tooth at about mid-length, a tiny denticle proximad, base of subapical tooth with prominent recurved acute tooth, directed posteriorly, subapical tooth shorter than width of mandible at base, about twice as long as apical tooth, only one intercalary tooth present, outer margin of mandible broadly flattened at base; labrum about as long as broad, with two long, bluntly rounded anterior lobes, sinus between them deep, length of anterolateral lobe longer than or about equal to distance from base of sinus to transverse carina at base of labrum; arcuate promesonotal groove and metanotal groove strongly impressed; propodeal tooth small, at about midlength of posterior face of propodeum, infradental lamella very narrow; first gastral tergite largely devoid of setae, with one pair of squamiform setae at posterolateral margins; first gastral sternite with pronounced median keel.

The *queen* and *male* are unknown.

Comments. Workers of this species fall into two distinct size classes. Five specimens have HW 0.54–0.58. Four of these are from La Selva Biological Station (50–150 m elevation), all from different samples, and one is from a 500 m elevation site on the Barva Transect above La Selva. A series of three specimens from one miniWinkler sample (and thus probably from the same colony) have HW 0.74, longer and relatively thinner mesotibiae, and a more robust flattened mandibular base. These are from immediately adjacent to La Selva, at 160 m elevation. There is the potential that they are two cryptic species. The holotype and paratype were chosen from the one series of larger workers.

Biology. This species occurs in lowland rainforest, from 150–500 m elevation. All specimens are from Winkler samples of sifted leaf litter. It is rare: it occurred in three of 208 Project ALAS Berlese samples, and three of over 1500 TEAM project miniWinkler samples.

Etymology. The mandible looks like a bottle opener.

***Rhopalothrix atitlanica* Longino & Boudinot, sp. nov.**

(Figs 1B, 2B, 3E, 7, 16)

Type material. *Holotype, worker:* GUATEMALA, Suchitepéquez: 5 km S Volcán Atitlán, 14.54074 -91.18815 ±35 m, 1400 m, 18 Jun 2009, cloud forest, ex sifted leaf litter (LLAMA#Wm-B-09-2-07) [CAS, unique specimen identifier CASENT0611854]. *Paratypes* (workers): same data as holotype but 5.5 km S Volcán Atitlán, 14.52857 -91.19569 ±200 m, 1070 m, 18 Jun 2009, riparian forest, ex sifted leaf litter (LLAMA#Wm-B-09-2-08) [USNM, CASENT0629577; MCZC, CASENT0629578].

Geographic range. Guatemala.

Diagnosis. Anterior labral lobe bilobed or bidentate on each side of medial notch, with lateral lobule longer than medial lobule; masticatory margin of mandible with two teeth; squamiform setae of first gastral tergite abundant, short, 2 × longer than wide; HW 0.49–0.51.

Description. *Worker.* HW 0.49–0.51 (n=3); mandible with two teeth on masticatory margin, second tooth from base largest; subapical tooth with minute reclinate denticle at base; subapical tooth about twice as long as apical tooth; intercalary teeth distinct, one closest to apical tooth about half as long as apical tooth; labrum trapezoidal, anterior margin bilobed or bidentate on each side of medial notch, lateral lobule triangular, longer than medial lobule, medial lobules rounded, flanking semicircular median notch; arcuate promesonotal groove and metanotal groove moderately impressed; propodeal tooth right angled, infradental lamella evenly and shallowly concave; squamiform setae abundant on first gastral tergite, uniformly covering entire tergite; gastral setae relatively short, 2 × longer than wide, tapering evenly from apex to base.

The *queen* and *male* are unknown.

Biology. This species occurs in cloud forest, from 1050–1400 m elevation. It is known only from the slopes of Volcán Atitlán, where it is sympatric with *R. isthmica*. At the type locality it seemed to occur just below the zone of high abundance of *R. isthmica*, at the lower edge of the cloud forest and at the transition to extensive coffee plantations at lower elevations. The six known specimens are from Winkler samples of sifted leaf litter.

Etymology. Referring to the type locality.

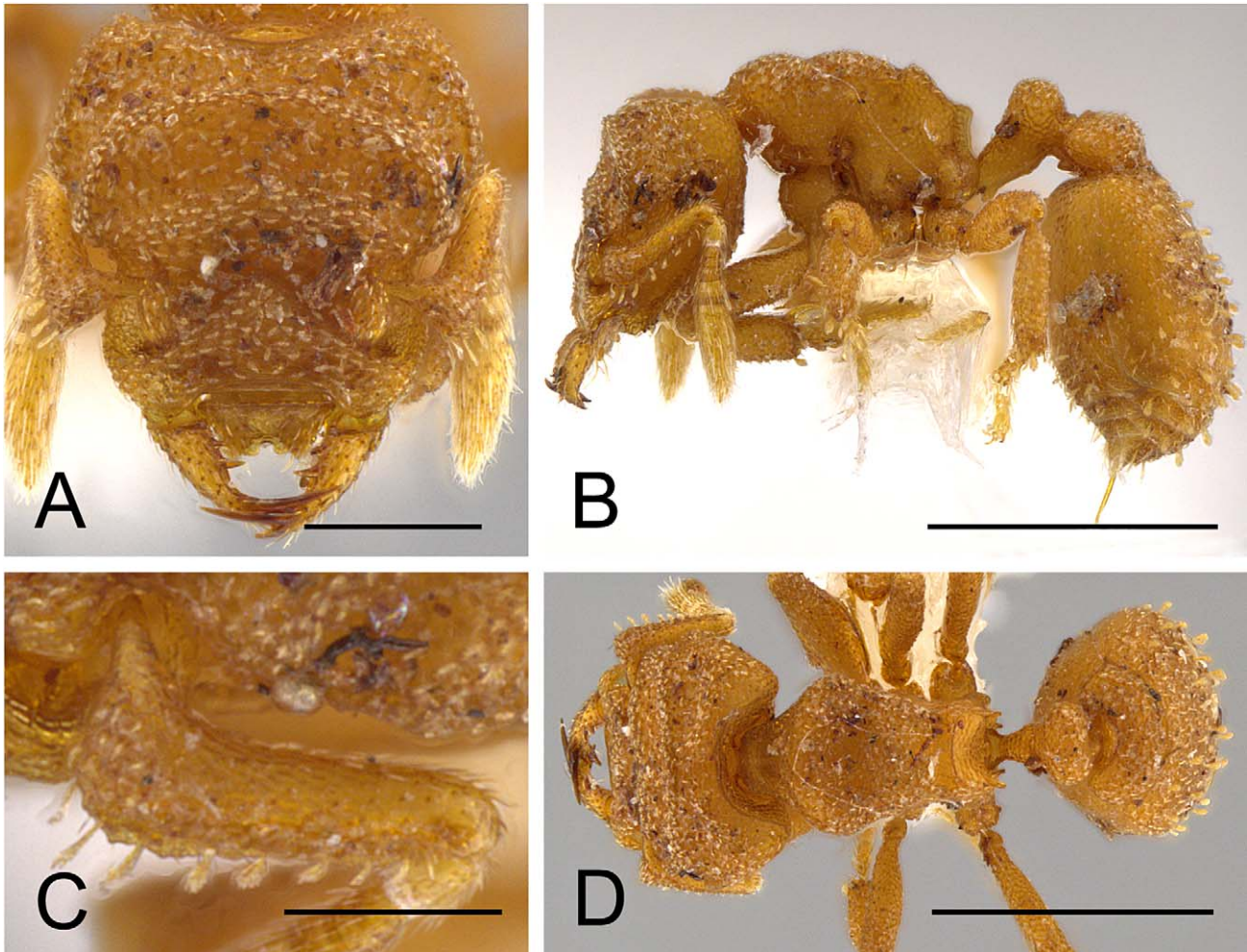


FIGURE 7. *Rhopalothrix atitlanica* sp. nov., holotype worker (Guatemala, CASENT0611854). **A.** Fullface view. **B.** Lateral view. **C.** Scape, lateral view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

***Rhopalothrix ciliata* Mayr, 1870**

Rhopalothrix ciliata Mayr, 1870: 415. Lectotype, worker: Colombia, Santa F de Bogot [NMW] (not examined).

***Rhopalothrix diadema* Brown & Kempf, 1960**

Rhopalothrix diadema Brown & Kempf, 1960: 239, fig. 59. Holotype, worker: New Guinea, lower Busu River, near Lae, lowland rainforest (E.O. Wilson, no. 1052) [MCZC] (not examined).

***Rhopalothrix isthmica* (Weber, 1941)**

(Figs 1A, 2C, 3D, 8, 16)

Acanthidris isthmicus Weber, 1941: 188, figs 4–7. Holotype, worker: Panama, Barro Colorado Island, 29 July 1938 (E.C. Williams, Jr. No.313(131)) [MCZC?] (not examined).

Rhopalothrix isthmica: Brown & Kempf, 1960: 235.

Geographic range. Panama, Honduras, Guatemala.

Description. *Worker.* HW 0.58–0.68 (n=13); mandible with three teeth on masticatory margin, middle tooth largest; subapical tooth with distinct reclinate denticle at base; subapical tooth about twice as long as apical tooth;

intercalary teeth prominent, one closest to apical tooth about half as long as apical tooth; labrum trapezoidal, anterior lobes triangular, inner margins of lobes shallowly sloping to semicircular median notch; propodeal tooth acute to right-angled, infradental lamella evenly and shallowly concave; squamiform setae abundant on first gastral tergite, either uniformly covering entire tergite or covering varying extent of posterior portion, at least posterior half with abundant setae.

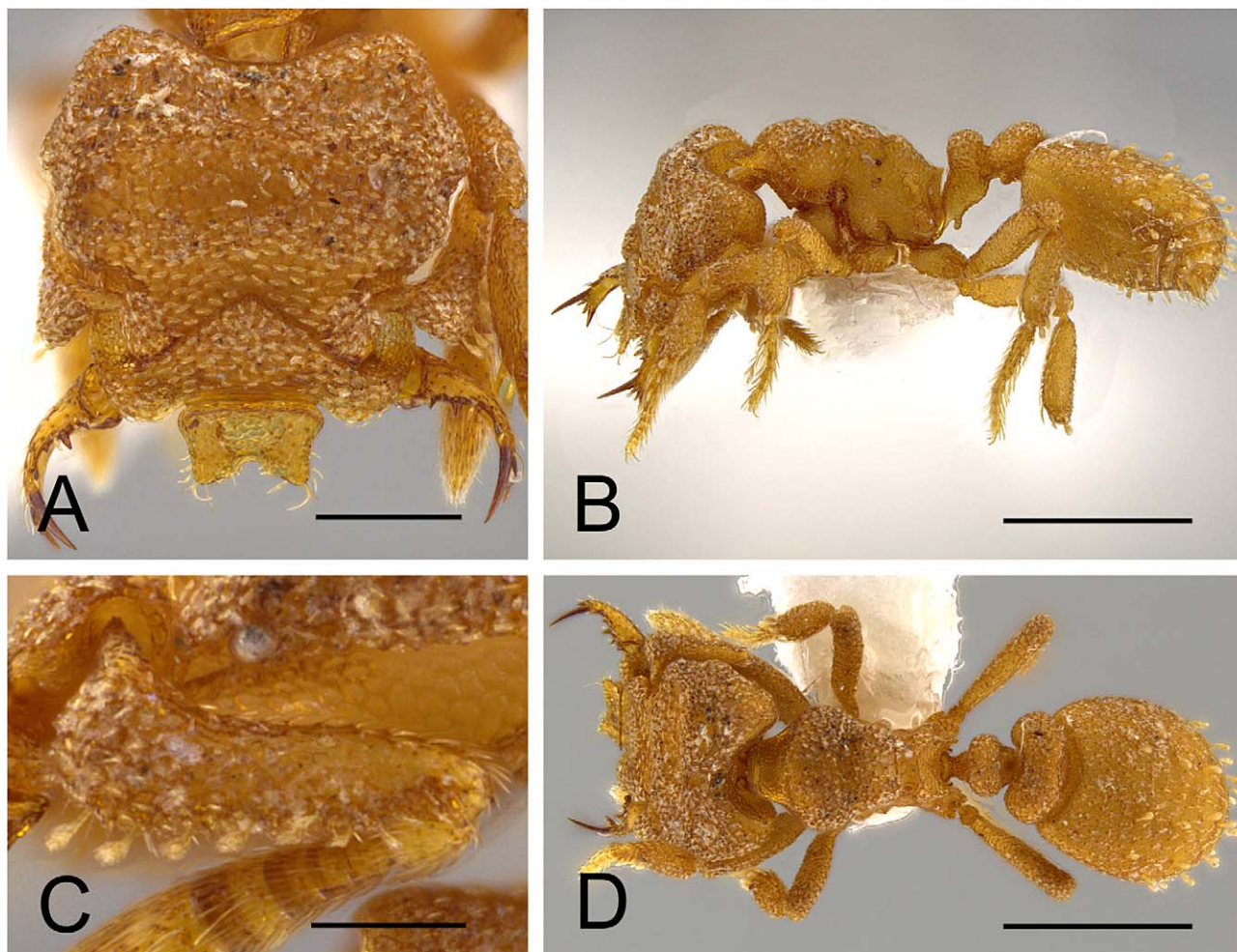


FIGURE 8. *Rhopalothrix isthmica*, worker (Guatemala, CASENT0629574). **A.** Full-face view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

The *queen* and *male* are unknown.

Biology. This species occurs in moderately seasonal to aseasonal wet forest, from sea level to 2000 m elevation. All recent specimens are from Winkler or Berlese samples of sifted leaf litter. It is rare for ant species to occur across such a broad elevational spectrum, and given the considerable variability in setal pattern and wide geographic range, it may comprise multiple allopatric populations with unknown degrees of genetic divergence. In Honduras it was a rare cloud forest species at Comayagua and La Muralla and a rare lowland species along the north Caribbean coast. At La Union, in the mountains southeast of Zacapa, Guatemala, it was a rare species sympatric with the much more abundant *R. megisthmica*. In cloud forest on the slopes of Volcán Atitlán in western Guatemala it was abundant—occurring in 29 of 100 miniWinkler samples—and sympatric with the smaller *R. atitlanica*.

***Rhopalothrix kusnezovi* Brown & Kempf, 1960**

Rhopalothrix kusnezovi Brown & Kempf, 1960: 238, fig. 60. Holotype, queen: Argentina, Tucumán (N. Kusnezov, no. 10068) [IFML] (not examined).



FIGURE 9. *Rhopalothrix megisthmica* sp. nov., holotype worker (Guatemala, CASENT0612564). **A.** Fullface view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

***Rhopalothrix megisthmica* Longino & Boudinot, sp. nov.**

(Figs 1B, 2C, 3F, 9, 16)

Type material. *Holotype, worker:* Guatemala, Zacapa: 2 km SE La Union, 14.94460 –89.27726 ±57 m, 1550 m, 12 May 2009, cloud forest, ex sifted leaf litter (LLAMA Wm-B-03-1-05) [CAS, unique specimen identifier CASENT0612564]. *Paratypes* (workers): same data as holotype but 14.94665 –89.27593 ±50 m (LLAMA#Wa-B-03-1-04) [USNM, CASENT0614540]; 14.94677 –89.27585 ±50 m (LLAMA#Wa-B-03-1-07) [MCZC, CASENT0614546]; 14.94723 –89.27707 ±50 m (LLAMA#Wa-B-03-1-45) [UNAM, CASENT0612503]; 14.95372 –89.27618 ±50 m, 1430 m (LLAMA#Wa-B-03-2-31) [UVGC, CASENT0629572; ECOSCE, CASENT0629573]; 3.5 km SE La Union, 14.95 –89.27 (unknown error), 1500 m, 4 Jun 1991 (R.S. Anderson#RSA91-050) [LACM, CASENT0603567; EAPZ, CASENT0603699].

Geographic range. Guatemala, Mexico.

Diagnosis. Differing from *R. isthmica* in larger size (HW > 0.73 versus < 0.69), and with propodeal tooth larger and more acute.

Description. *Worker.* HW 0.73–0.83 (n=12); mandible with two or three teeth on masticatory margin (can vary within individuals, with two teeth on one mandible and three teeth on the other), second tooth from base largest; subapical tooth with distinct reclinate denticle at base; subapical tooth about twice as long as apical tooth; intercalary teeth prominent, one closest to apical tooth about half as long as apical tooth; labrum trapezoidal, anterior lobes triangular, inner margins of lobes shallowly sloping to semicircular median notch; metanotal groove moderately to strongly impressed; propodeal tooth usually large and acute (shorter and obtuse on one specimen),

infradental lamella evenly and shallowly concave; squamiform setae abundant on first gastral tergite, either uniformly covering entire tergite or covering at least 3/4 of posterior portion.

The *queen* and *male* are unknown.

Biology. This species occurs in cloud forest habitats, from 1400–2000 m elevation. All specimens are from Winkler or Berlese samples of sifted leaf litter. It is sympatric with *R. isthmica* at the type locality and with *R. triumphalis* on the slopes of Volcán Tacaná in Chiapas. At the type locality it was moderately abundant, occurring in 24 of 100 miniWinkler samples.

Etymology. Referring to its similarity to *R. isthmica*, differing mainly in larger size.

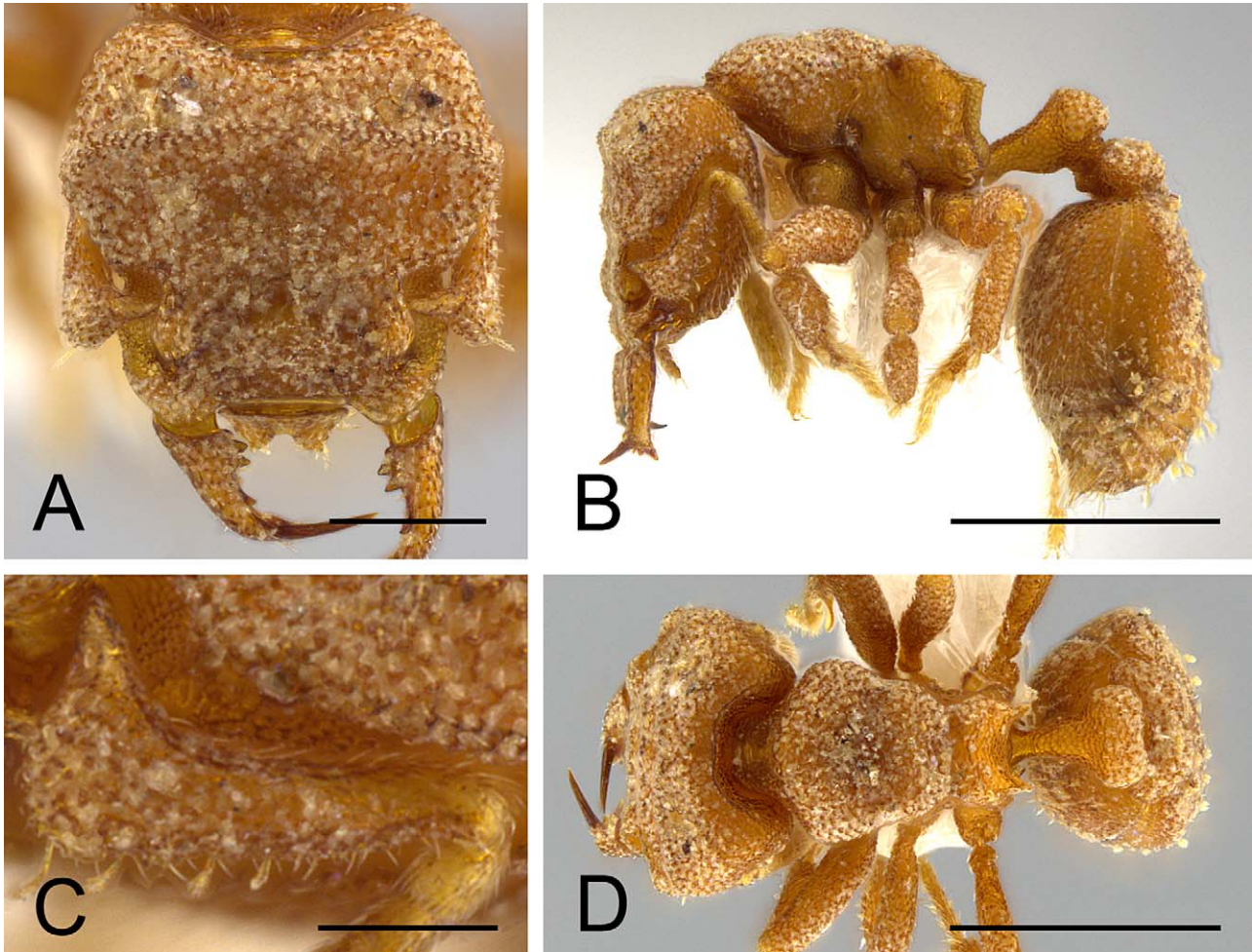


FIGURE 10. *Rhopalothrix nubilosa* sp. nov., holotype worker (Costa Rica, CASENT0629594). **A.** Fullface view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

***Rhopalothrix nubilosa* Longino & Boudinot, sp. nov.**

(Figs 1D, 2D, 3C, 10, 16)

Type material. *Holotype, worker:* COSTA RICA, Heredia: 10 km NE Vara Blanca, 10.23696 -84.11983 \pm 125 m, 1500 m, 9 Mar 2005, montane wet forest, second growth, vegetation only about 4 m high, ex sifted leaf litter (ALAS#15/WF/02) [CAS, unique specimen identifier CASENT0629594]. *Paratypes* (workers): same data as holotype [JTL, CASENT0629593]; same data but 10.23684 -84.11909 \pm 50 m, mature forest (ALAS#15/WF/02/09) [INBio, INB0003666702]; 10.23754 -84.12001 \pm 50 m (ALAS#15/WF/02/43) [INBio, INB0003667096]; 10.23771 -84.11998 \pm 50 m (ALAS#15/WF/02/47) [INBio, INB0003667132]; 10.23243 -84.11620 \pm 50 m (ALAS#15/WF/04/15) [INBio, INB0003668070]; 10.23216 -84.11618 \pm 50 m (ALAS#15/WF/04/21) [INBio, INB0003668120].

Geographic range. Costa Rica.

Diagnosis. Sharing with *R. subspatulata* and *R. weberi* a characteristic labrum shape: anterior margin of labrum with two long, bluntly triangular lobes, sinus between them deep, length of anterolateral lobe longer than or about equal to distance from base of sinus to transverse carina at base of labrum; differing from both in larger size (HW = 0.57 versus < 0.50); differing from *R. weberi* in subapical tooth longer than apical tooth (about same length in *R. weberi*); differing from *R. subspatulata* in larger number of squamiform setae on first gastral tergite (about 12 versus about 6).

Description. *Worker.* HW 0.57 (n=1); mandible with two closely-spaced short triangular teeth at base, a smaller tooth about mid-distance between basal teeth and base of subapical tooth, reclinate denticle at base of subapical tooth minute but present, apical tooth half the length of subapical tooth, intercalary teeth minute; labrum about as long as broad, with two long, bluntly triangular lobes, sinus between them deep, length of anterolateral lobe longer than or about equal to distance from base of sinus to transverse carina at base of labrum; erect setae on leading edge of scape moderately clavate, longest on basal bend, becoming shorter and thinner toward apex; arcuate promesonotal groove and metanotal groove moderately impressed; propodeal tooth right angled, infradental lamella evenly and shallowly concave; first gastral tergite with 6–8 squamiform setae on posterior margin, a similar number distributed between posterior border and midlength of tergite.

The *male* is unknown.

Biology. This species occurs in cloud forest, at 1500 m elevation. It is known from one site on the Barva Transect in Costa Rica, where it occurred in 5 of 200 miniWinkler samples.

Comments. This is a slightly more robust version of *R. subspatulata*. Among several other species of *Rhopalothrix* considered in this report, this degree of difference would be considered intraspecific. However, the sharply parapatric distribution on the Barva transect and the low variability among the many lowland collections of *R. subspatulata* suggest a separate montane species.

Etymology. Referring to the cloud forest habitat.

***Rhopalothrix orbis* Taylor, 1968**

Rhopalothrix orbis Taylor, 1968: 336, figs. 1–3. Holotype, worker: Australia, Queensland: Tamborine Mountains, north side near Curtis Falls, Berlese funnel sample, leafmould, rainforest, 8.v.1953 (T. E. Woodward) [ANIC] (not examined).

***Rhopalothrix plaumanni* Brown & Kempf, 1960**

Rhopalothrix plaumanni Brown & Kempf, 1960: 235, fig. 58. Holotype, worker: Brazil, Santa Catarina: Nova Teutônia (F. Plaumann) [MZSP, paratype worker at MCZC] (not examined).

Rhopalothrix acutipilis Kempf, 1962: 28, fig. 28. Holotype, queen: Brazil, Santa Catarina: Nova Teutônia, V-1960 (F. Plaumann) (not examined). **New Synonymy.**

Comments. In this study queens were associated with workers for three Central American species. The queens differed from the workers in pilosity and the shape of the face. The queens bore numerous short bristles, which are lacking on the workers, and the worker faces had much stronger grooves and gibbosities. The characteristics of the mandible and labrum were shared between queens and workers. Examination of the figures for *R. plaumanni* and *R. acutipilis*, the types of which are from the same locality and by the same collector, suggest that *R. acutipilis* is the queen of *R. plaumanni*.

***Rhopalothrix stannardi* Brown & Kempf, 1960**

(Figs 1C, 2F, 3D, 11, 16)

Rhopalothrix stannardi Brown & Kempf, 1960: 236, fig. 57. Holotype, worker: Mexico, Chiapas: Ocosingo Valley, Finca el Real, 1–7 July 1950 (C. and M. Goodnight and L.J. Stannard) [MCZC] (not examined).

Geographic range. Mexico (Chiapas), Guatemala.

Description. *Worker.* HW 0.53–0.59 (n=5); mandible with three widely spaced denticles on masticatory margin, middle denticle largest; subapical tooth with minute reclinate denticle at base; subapical tooth about twice as long as apical tooth; intercalary teeth prominent, one closest to apical tooth about half as long as apical tooth; labrum subrectangular, outer margins diverging anteriorly, anterior margin very shallowly and evenly concave, with minute notch medially; posterior margin of clypeus elevated above anterior face; arcuate grooves and ridges of face very shallow; mesosomal dorsum evenly and shallowly convex in profile, metanotal groove not or very weakly impressed; propodeal tooth obtuse to right angled, infradental lamella broad and descending almost perpendicularly from tooth; about 12 squamiform setae on posterior half of first gastral tergite.

The *queen* and *male* are unknown.

Biology. Recent collections of this species are from lowland wet to moist forest habitat, from 70–270 m elevation. The type is apparently from a somewhat higher site near Ocosingo. All recent specimens are from Winkler samples of sifted leaf litter. In quantitative sampling carried out during Project LLAMA, this species occurred in 4 of 100 miniWinkler samples at a lowland Chiapas site and in 7 of 100 samples from in and near Tikal National Park in Guatemala.

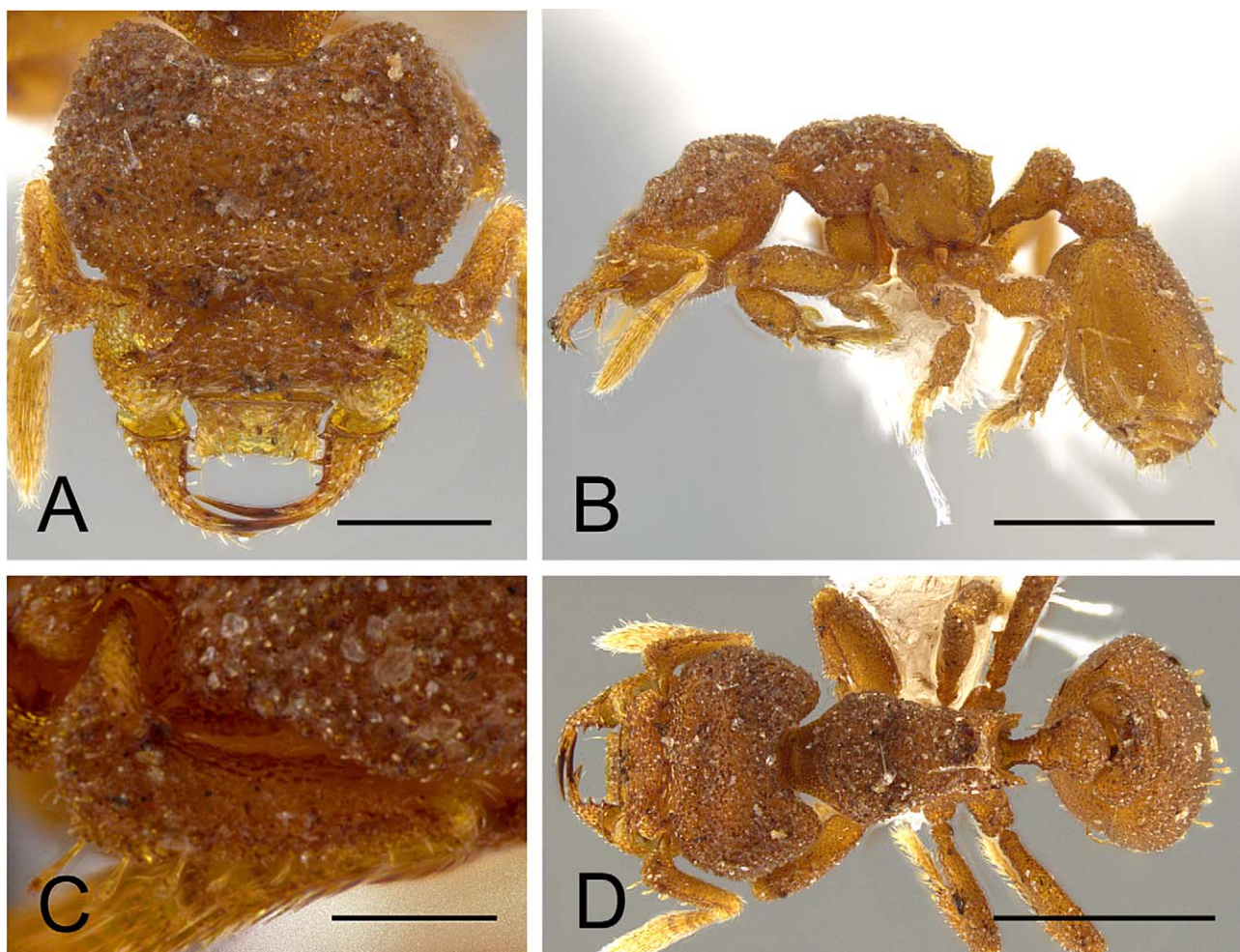


FIGURE 11. *Rhopalothrix stannardi* (Guatemala, CASENT0610397). **A.** Full-face view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

***Rhopalothrix subspatulata* Longino & Boudinot, sp. nov.**
(Figs 1D, 2D, 3B, 4, 12, 16)

Type material. *Holotype worker:* COSTA RICA, Heredia: La Selva Biological Station, 10.43333 -84.01667 ±1.5 km, 50 m, 1 Feb 1994, rainforest, ex Berlese of litter and soil (ALAS#B/05/381) [INBio, unique specimen identifier INBIOCRI001259541]. *Paratypes* (workers): same data as holotype [LACM, INBIOCRI001259538; MCZC, INBIOCRI001259539; USNM, INBIOCRI001259540; CAS, INBIOCRI001259542]; same data but 15 Apr 1993 (ALAS#B/05/053) [EAPZ, INBIOCRI002281441].

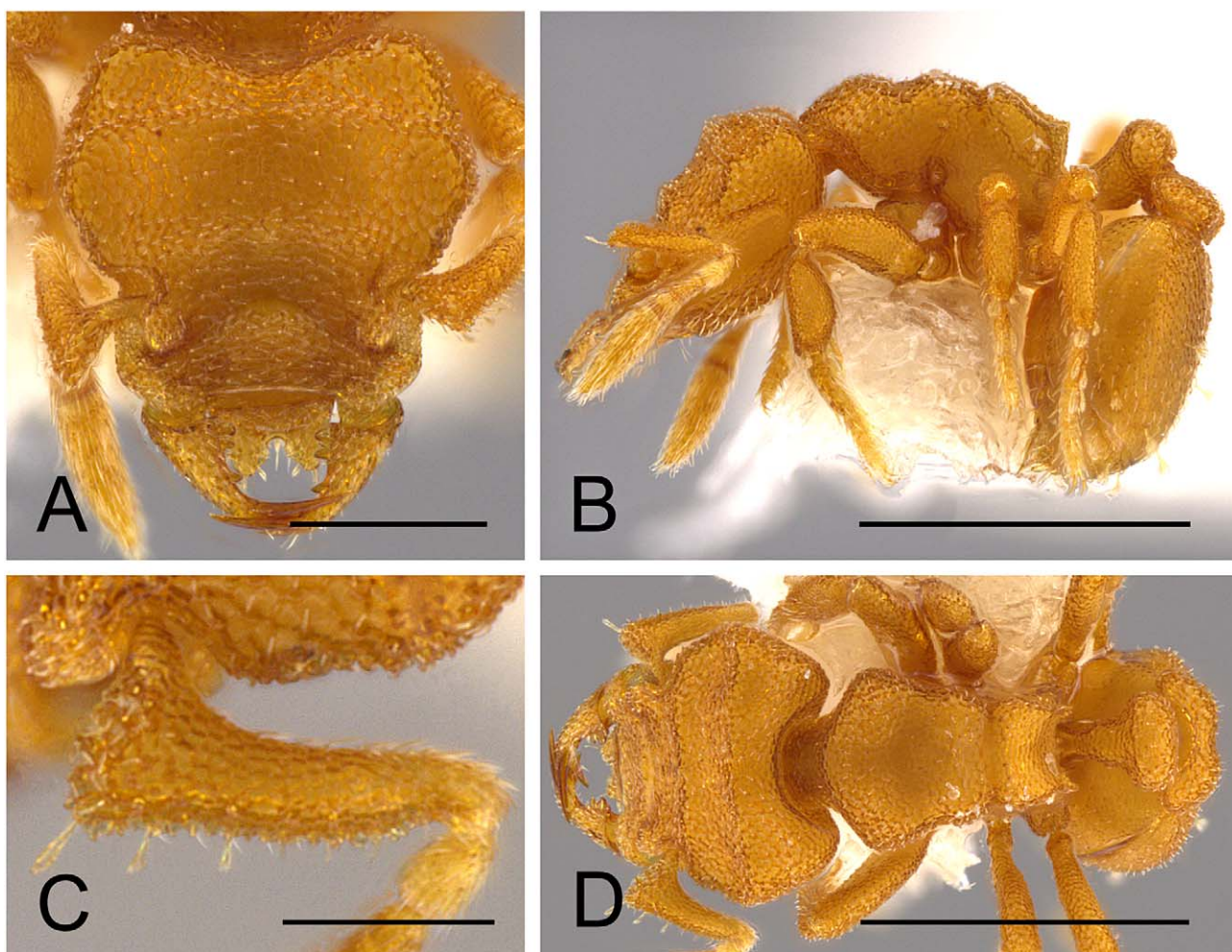


FIGURE 12. *Rhopalothrix subspatulata* sp. nov., holotype (Costa Rica, INBIOCRI001259541). **A.** Fullface view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

Geographic range. Costa Rica, Nicaragua.

Diagnosis. Sharing with *R. nubilosa* and *R. weberi* a characteristic labrum shape: anterior margin of labrum with two long, bluntly triangular lobes, sinus between them deep, length of anterolateral lobe longer than or about equal to distance from base of sinus to transverse carina at base of labrum; worker hardly differing from *R. weberi*, being slightly larger (HW > 0.40) and with larger mandibular teeth; queen differing from *R. weberi* in stronger facial concavity and carina medial to compound eye; worker differing from *R. nubilosa* in smaller size (< 0.50) and fewer squamiform setae on first gastral tergite (six versus about twelve).

Description. *Worker.* HW 0.42–0.49 (n=14); mandible with two closely-spaced short triangular teeth at base, a smaller tooth about mid-distance between basal teeth and base of subapical tooth, reclinate denticle at base of subapical tooth absent, apical tooth short, about $\frac{1}{3} \times$ length of subapical tooth, intercalary teeth minute; labrum about as long as broad, with two long, bluntly triangular lobes, sinus between them deep, length of anterolateral lobe longer than or about equal to distance from base of sinus to transverse carina at base of labrum; erect setae on leading edge of scape stiff but narrow, hardly clavate, unlike the squamiform setae typical of many other species; arcuate promesonotal groove and metanotal groove moderately impressed; propodeal tooth right angled, infradental lamella thin, evenly and shallowly concave; first gastral tergite with four squamiform setae on posterior margin, two at mid-disk.

Queen. HW 0.51–0.53 (n=2); mandible and labrum similar to worker; face shape similar to worker but with large, shallow, circular concavity medial to compound eye, separated from eye by distinct slightly elevated carina that partially covers eye in full face view; compound eye longer than maximum width of scape; ocelli small, cuticle adjacent to ocelli marked with black pigment spots on evenly light brown background; shape of propodeal tooth, infradental lamella, petiole and postpetiole similar to worker; katapisternum and anepisternum large, convex,

separated by thin groove; pubescence layer of abundant, short, curved setae covers mandible, face, scapes, legs, dorsal mesosoma and metasoma; abundant stiff erect setae on face, anterior edge of scape, side of head, dorsal mesosoma, dorsal gaster.

Fore wing: pterostigma placed about 3/5 the length of the costal margin; veins *Sc+R*, *M+Cu*, 1A, and crossvein *2rs-m* tubular; *2rs-m* terminating posteriorly as a node; veins *Rs*, *M*, and *Cu* nebulous; *Rs+M* spectral; vannal region vestigial; only basal and submarginal 1 cells enclosed by tubular or nebular veins. Hind wing: only veins *C+Sc+R* and 1A tubular, and only for a very short length of the remigium; veins *Sc+R*, *M+Cu*, *R*, *Rs* and crossvein *2rs-m* nebulous; no cells are closed; vannal region vestigial.

The *male* is unknown.

Biology. This species occurs in lowland rainforest, from 50–800 m elevation. Of the approximately 50 workers known, one was collected in a Malaise trap sample and the rest were in Berlese or Winkler samples. The Winkler samples were of sifted litter and rotten wood on the forest floor; the Berlese samples were cores of forest floor litter and about 5–10 cm of the mineral soil beneath. At La Selva Biological Station, 3% of 208 Berlese samples and 2% of 640 miniWinkler samples contained workers. Given that each miniWinkler sample covered an area about 60 times greater than a Berlese sample (1 m² versus 165 cm²), *R. subspatulata* was far more abundant in Berlese samples. This suggests that *R. subspatulata*, and perhaps *Rhopalothrix* in general, are subterranean, nesting and foraging in mineral soil, and perhaps only rarely venturing up into the litter layer. The pale color and greatly reduced eyes also suggest subterranean habits.

Alate queens were collected in three of 50 canopy fogging samples from the ALAS project at La Selva (<http://viceroy.eeb.uconn.edu/ALAS/ALAS.html>): 8 October and 10 November 1994 and 28 December 1999 (mid to late wet season). This suggests that the species mates above ground and has normally dispersing queens.

Etymology. Referring to the sparse spatulate setae on the gaster.

***Rhopalothrix therion* Longino & Boudinot, sp. nov.**

(Figs 1A, 2A, 3E, 13, 16)

Type material. *Holotype worker*: HONDURAS, Olancho: 9 km N Catacamas, 14.93693 -85.90535 ±20 m, 1360 m, 10 May 2010, mixed hardwood forest, ex sifted leaf litter (R.S.Anderson#2010-020) [CAS, unique specimen identifier CASENT0616292]. *Paratypes* (workers): same data as holotype [USNM, CASENT0616286]; same data but 14.93465 -85.90662 ±20 m, 1330m, 12 May 2010, *Liquidambar*-hardwood forest, ex sifted leaf litter (R.S.Anderson#2010-026) [MCZC, CASENT0629584; INBio, CASENT0629585].

Geographic range. Costa Rica to Honduras.

Diagnosis. Labrum broader than long, anterior margin bilobed on each side of medial notch, lateral lobule rounded and the same length as or shorter than medial lobule; first gastral tergite with abundant, short, strongly spatulate squamiform setae uniformly covering surface.

Description. *Worker*. HW 0.66–0.80 (n=6); mandible with two or three teeth on masticatory margin (can vary within individuals, with two teeth on one mandible and three teeth on the other), second tooth from base largest; subapical tooth with distinct reclinate denticle at base; subapical tooth about twice as long as apical tooth; intercalary teeth prominent, one closest to apical tooth about half as long as apical tooth; labrum trapezoidal, wider than long, anterior margin bilobed on each side of medial notch, lateral lobule rounded and the same length as or shorter than medial lobule; arcuate promesonotal groove and metanotal groove strongly impressed; propodeal tooth large, triangular, right-angled to acute, infradental lamella broad beneath tooth, narrowing ventrally; first gastral tergite with abundant, short, strongly spatulate squamiform setae uniformly covering surface.

The *queen* and *male* are unknown.

Biology. This species occurs in rain forest and cloud forest habitats, from 550–1420 m elevation. All specimens are from Winkler samples of sifted leaf litter. At three cloud forest sites in Nicaragua it occurred in 5–10% of 100 miniWinkler samples. In Costa Rica, it is known from one collection near Turrialba, a site on the Atlantic slope of the Cordillera Volcánica Central, yet is unknown from the intensively sampled Barva Transect a short distance away.

Etymology. Referring to the fierce habitus and to the deep furrows and rugosities on the face and mesosoma.

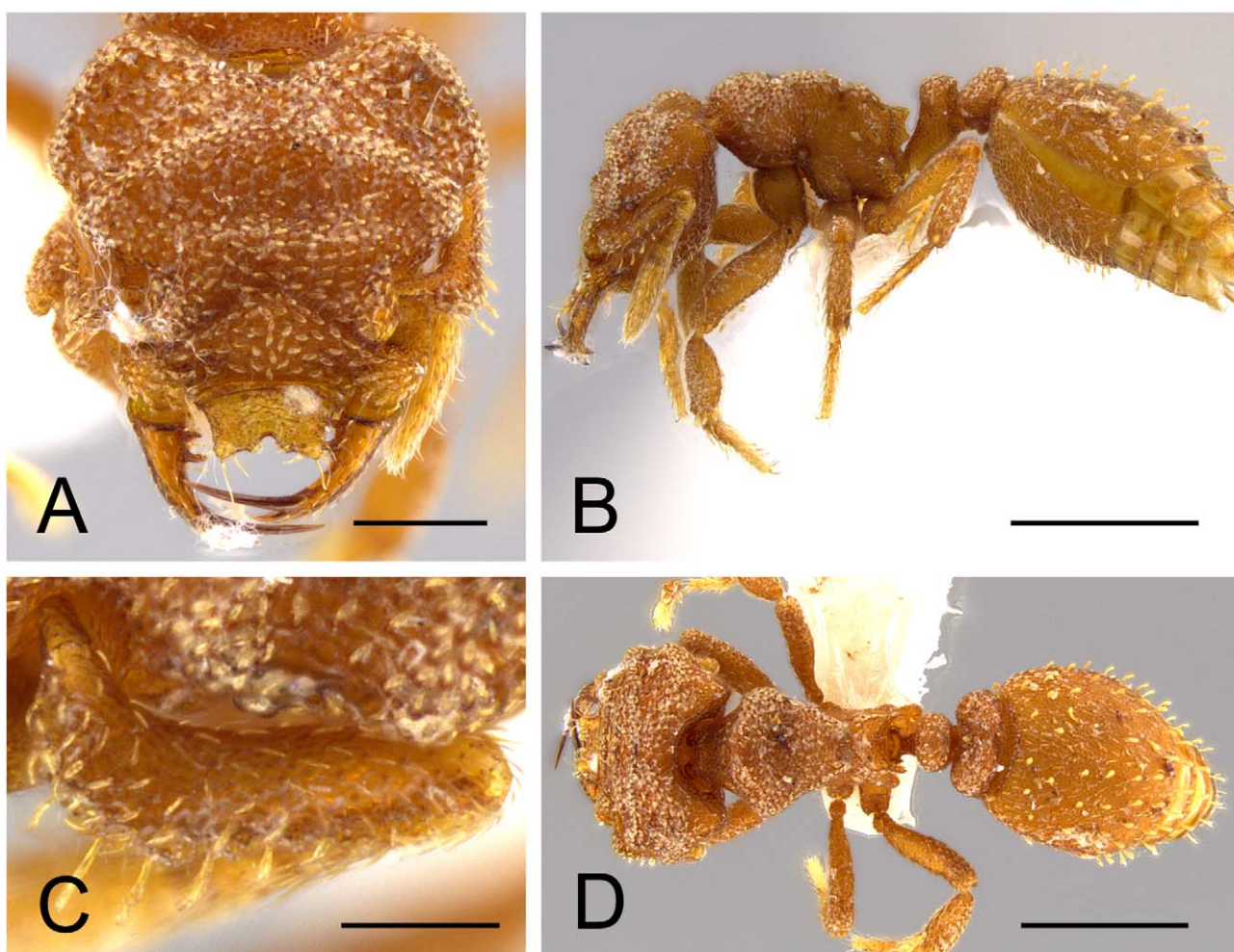


FIGURE 13. *Rhopalothrix therion* sp. nov., holotype worker (Honduras, CASENT0616292). **A.** Full-face view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

***Rhopalothrix triumphalis* Longino & Boudinot, sp. nov.**

(Figs 1A, 2B, 3F, 14, 16)

Type material. *Holotype, worker:* MEXICO, Chiapas: 2.8 km ESE Custepec, 15.72078 -92.93925 ± 50 m, 1800 m, 17 Jul 2007, mixed hardwood forest, ex sifted leaf litter (R.S. Anderson#2007-017) [CAS, unique specimen identifier CASENT0602067]. *Paratypes* (workers): same data as holotype but 18 Jul 2007, *liquidambar* forest (R.S. Anderson#2007-018) [ECOSCE, CASENT0601766]; 1.8 km SE Custepec, 15.72198 -92.95037 ± 50 m, 1530 m, mixed *liquidambar* forest (R.S. Anderson#2007-020) [MCZC, CASENT0601887]; 2 km SE Custepec, 15.72298 -92.94493 ± 50 m, 1650 m, ridgetop oak forest (R.S. Anderson#2007-021) [USNM, CASENT0601965]; 2.8 km SE Custepec, 15.72260 -92.93995 ± 50 m, 1840 m, oak forest (R.S. Anderson#2007-022) [UNAM, CASENT0603013].

Geographic range. Mexico (Chiapas).

Diagnosis. Anterior labral lobe bilobed, with lateral lobule longer than medial lobule; masticatory margin of mandible with two teeth; squamiform setae of first gastral tergite abundant, elongate, 4 × or 5 × longer than wide; HW 0.57–0.65.

Description. *Worker.* HW 0.57–0.65 (n=12); mandible with two teeth on masticatory margin, second tooth from base largest; subapical tooth with minute reclinate denticle at base; subapical tooth about twice as long as apical tooth; intercalary teeth prominent, one closest to apical tooth about half as long as apical tooth; labrum trapezoidal, anterior margin bilobed, lateral lobule triangular, longer than medial lobule, medial lobules rounded, flanking semicircular median notch; arcuate promesonotal groove and metanotal groove moderately impressed;

propodeal tooth variable, obtuse, right angled, or acute, infradental lamella evenly and shallowly concave; squamiform setae abundant on first gastral tergite, uniformly covering entire tergite; gastral setae relatively long and thin, 4–5 × longer than wide, with elongate stem below widened apex.

Queen. HW 0.69; mandible and labrum similar to worker; face shape similar to worker but with less strongly developed grooves and ridges; compound eye longer than maximum width of scape; ocelli small, cuticle adjacent to ocelli marked with black pigment spots on evenly light brown background; shape of propodeal tooth, infradental lamella, petiole and postpetiole similar to worker; katepisternum and anepisternum large, convex, separated by broad U-shaped groove; layer of sparse, long, appressed pubescence covers mandible, face, scapes, legs, dorsal mesosoma and metasoma; abundant stiff erect setae on face, anterior edge of scape, side of head, dorsal mesosoma, dorsal gaster.

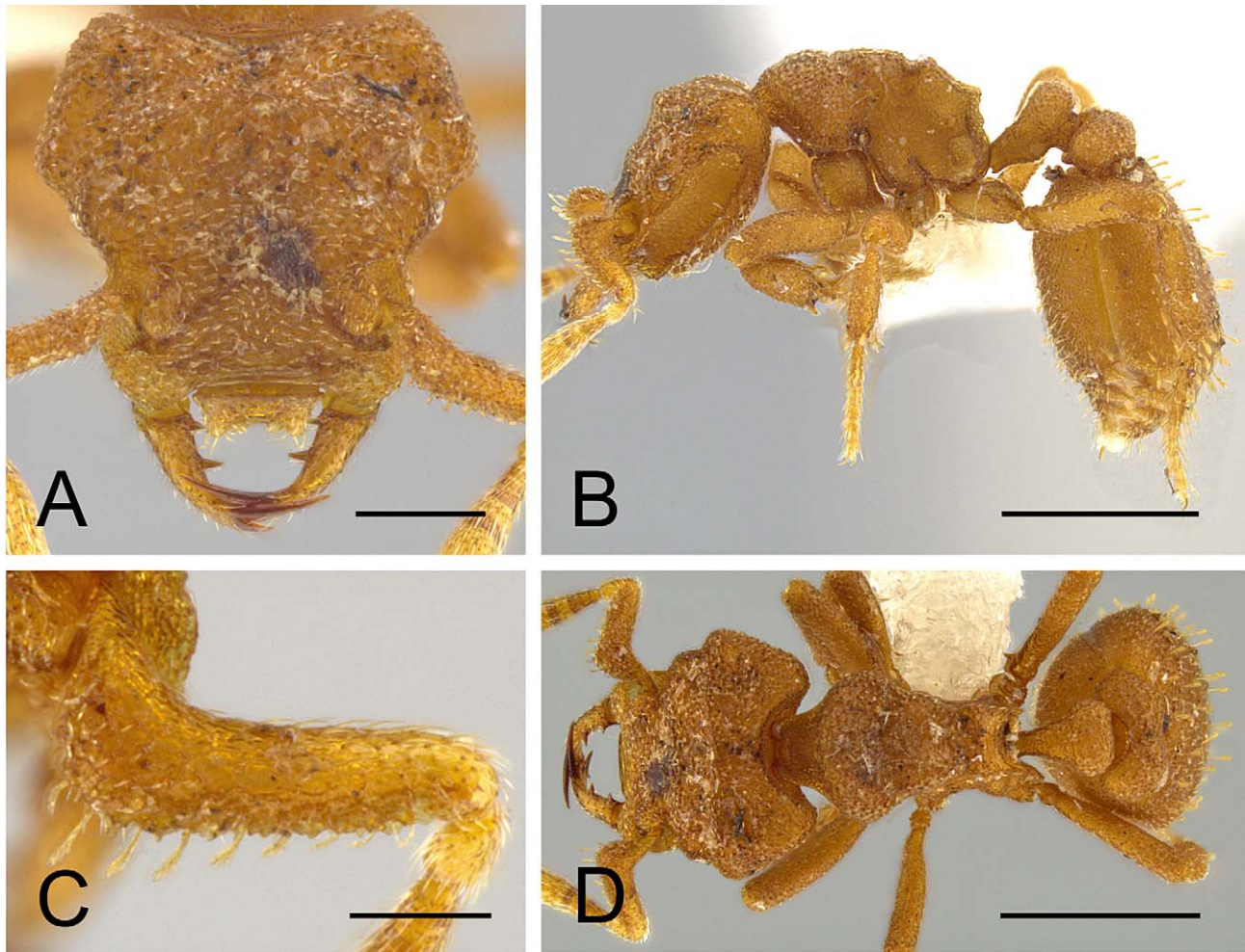


FIGURE 14. *Rhopalothrix triumphalis* sp. nov., holotype worker. (Mexico, CASENT0602067). **A.** Full-face view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

The *male* is unknown.

Biology. This species occurs in cloud forest habitats, from 1360–2140 m elevation. All specimens are from Winkler or Berlese samples of sifted leaf litter. It is sympatric with *R. megisthmica* on the slopes of Volcán Tacaná in Chiapas. At the type locality it was moderately abundant, occurring in 17 of 100 miniWinkler samples.

Comments. *Rhopalothrix triumphalis*, *R. atitlanica*, and *R. andersoni* share a distinctive labrum shape with bilobed anterolateral margin, with the lateral lobule longer and more triangular than the medial lobule. The three form a geographic replacement series, with no known zones of sympatry. An isolated specimen from eastern Guatemala (Petén: 13 km NW Machaquilá, 16.44173 -89.53527 ±26m, 390m, 28 May 2009, LLAMA#Wm-B-06-1-05, CASENT0614342) matches the size and morphology of *R. triumphalis*, differing only in the disposition of squamiform setae on the gaster. Instead of uniformly covering the first gastral tergite, they cover only the posterior 3/4. This specimen is left unidentified in this report, pending further understanding of the group.

Etymology. Referring to the type locality, El Triunfo Biosphere Reserve in the Sierra Madre de Chiapas.

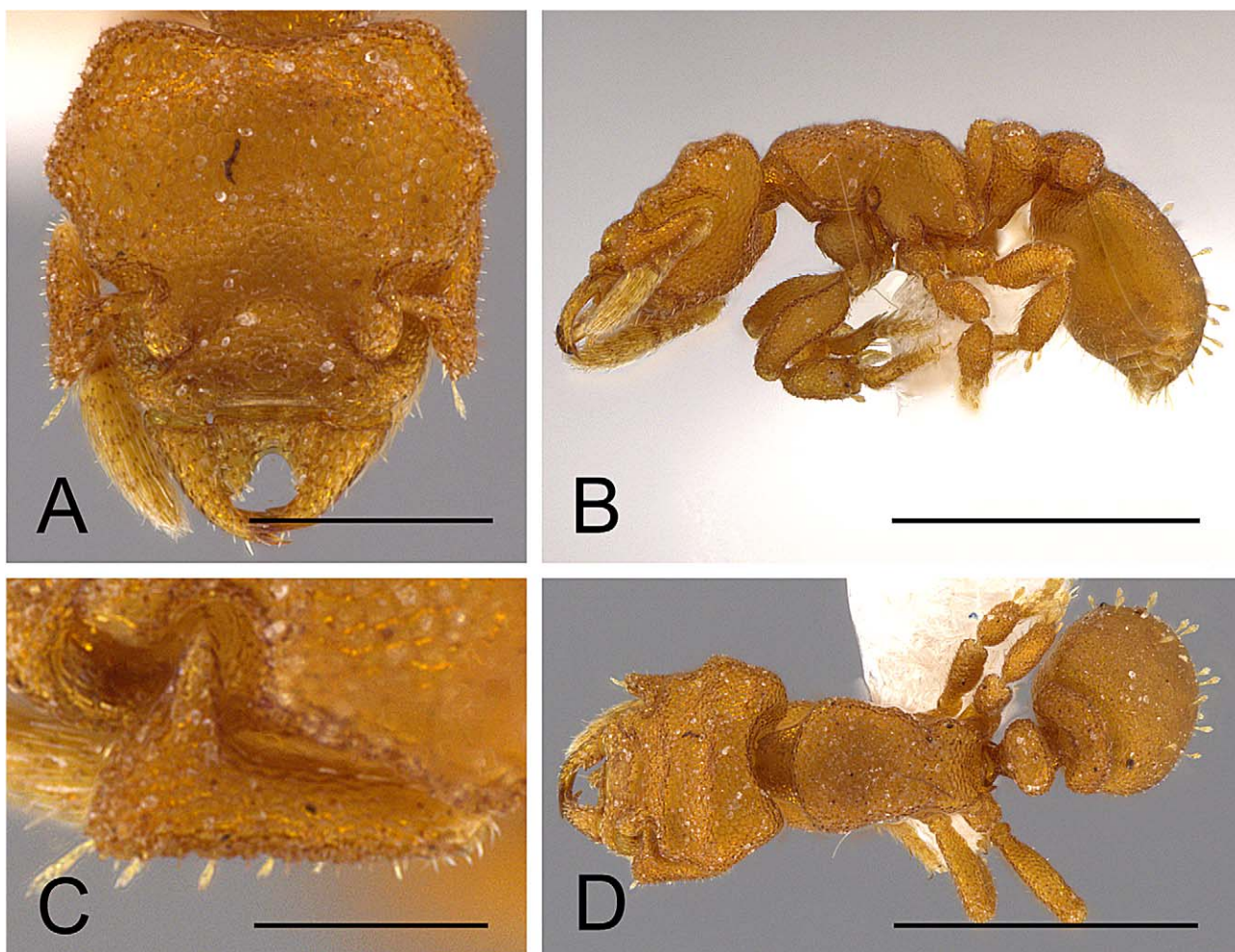


FIGURE 15. *Rhopalothrix weberi* worker (Guatemala, CASENT0610659). **A.** Full-face view. **B.** Lateral view. **C.** Scape, dorsal view. **D.** Dorsal view. Scale bars are 0.2 mm for A, 0.5 mm for B, D, and 0.1 mm for C.

***Rhopalothrix weberi* Brown & Kempf, 1960**

(Figs 1E, 2E, 3C, 15, 16)

Rhopalothrix weberi Brown & Kempf, 1960: 234. Holotype, worker: Cuba, Las Villas: Casa Harvard near Central Soledad, 24 July 1933, in red clay from under stones and grass roots which had been run through a Berlese funnel (N.A. Weber) [MCZC] (not examined). Replacement name for *Heptastruma wheeleri* Weber, 1934: 55. [Junior secondary homonym of *Rhopalothrix wheeleri* Mann, 1922: 43.].

Geographic range. Cuba, Honduras to southern Mexico.

Description. *Worker* (based on two workers from Tikal National Park, Guatemala). HW 0.38–0.39 (n=2); mandible with two closely-spaced, very short teeth at base, these basal teeth with broad confluent bases, either with distinct denticulate apices or completely confluent and forming a low lamina at base, a small denticle about mid-distance between basal teeth and base of subapical tooth, reclinate denticle at base of subapical tooth absent, subapical tooth shorter than width of mandible at base, only slightly longer than subapical tooth, intercalary teeth present but minute; labrum about as long as broad, with two long, bluntly triangular lobes, sinus between them deep, length of anterolateral lobe longer than or about equal to distance from base of sinus to transverse carina at base of labrum; anterior clypeal margin concave; erect setae on leading edge of scape stiff but narrow, hardly clavate, unlike the squamiform setae typical of many other species; arcuate promesonotal groove and metanotal groove weakly impressed; propodeal tooth right angled, infradental lamella thin, evenly and shallowly concave; first gastral tergite with sparse squamiform setae on posterior half, one specimen with five setae on posterior margin and three anteriorly, one specimen with seven and five, respectively.

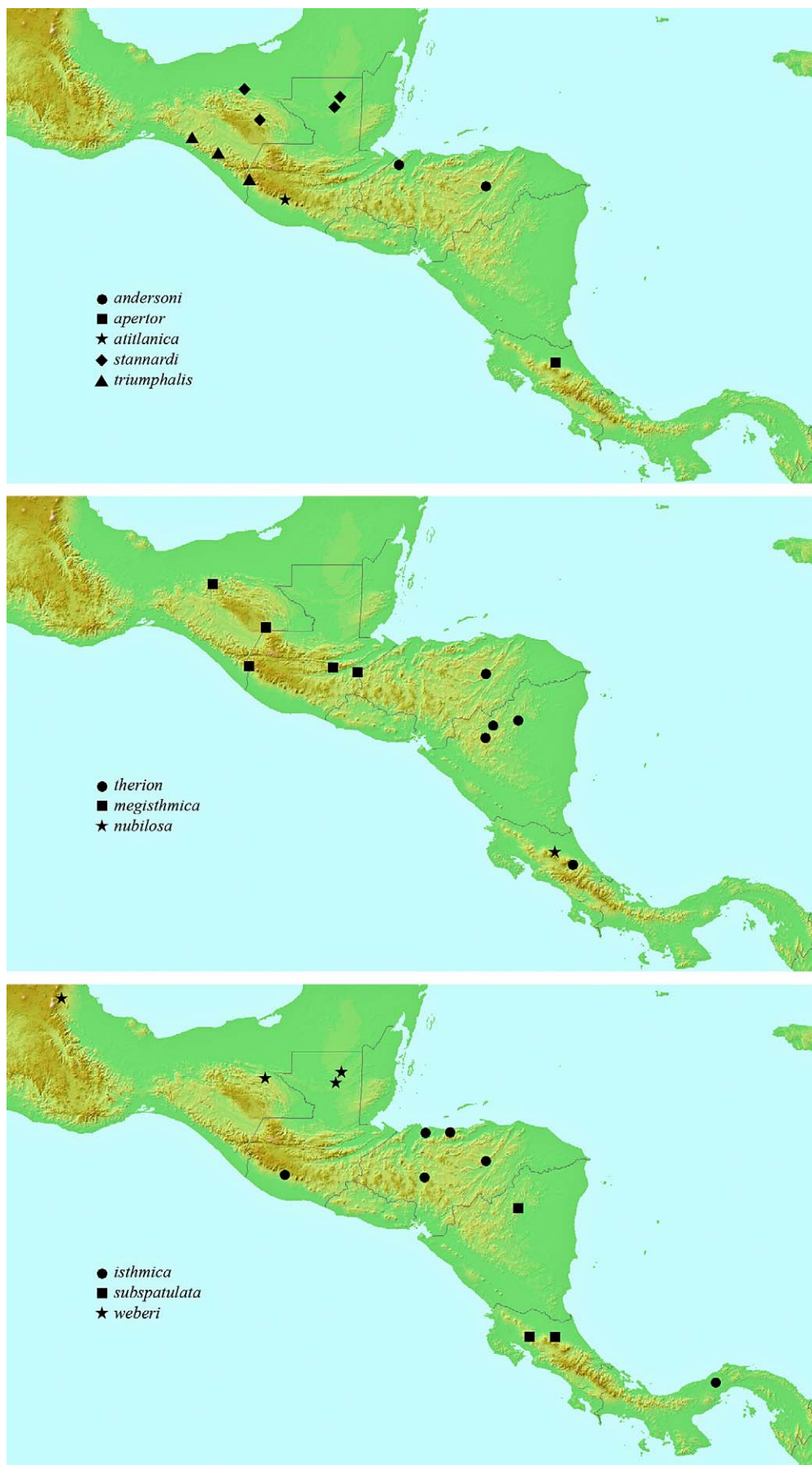


FIGURE 16. Central American distribution maps of *Rhopalothrix* species. *Rhopalothrix weberi* also occurs in Cuba.

Queen. HW 0.40–0.54 (n=5); mandible and labrum similar to worker; face shape similar to worker but with grooves and ridges more shallowly impressed; compound eye shorter than maximum width of scape, with 5–6 facets across longest axis; ocelli small, cuticle adjacent to ocelli marked with black pigment spots on evenly light brown background; shape of propodeal tooth, petiole and postpetiole similar to worker; shape of infradental lamella variable (see Comments); katapisternum and anepisternum large, convex, separated by broad groove; pubescence layer of abundant, short, curved setae covers mandible, face, scapes, legs, dorsal mesosoma and metasoma; abundant stiff erect setae on face, anterior edge of scape, side of head, dorsal mesosoma, dorsal gaster.

The *male* is unknown.

Biology. This species occurs in lowland wet to moist forest, from 200–575 m elevation. The recent collections are all from Winkler samples of sifted litter and rotten wood on the forest floor. Among the Project LLAMA specimens, seven are dealate queens and only two are workers, mostly from separate samples. This could reflect subterranean habits of the workers, with new queens dispersing up into the litter layer.

Comments. Judging from the descriptions of Weber (1934) and Brown & Kempf (1960), and the geographic proximity of the Petén region to Cuba, we tentatively assign to *R. weberi* material from eastern Chiapas, across the Petén region, and south to north coastal Honduras. Quiroz-Robledo & Valenzuela-González (2010) identified a worker from Veracruz as *R. weberi*, which, based on the figure in the publication, also appears to belong here. Four queens from Tikal National Park and vicinity are very uniform, with HW 0.40–0.41 and the propodeal infradental lamella thin and very like the workers from this locality. One queen from near La Ceiba in Honduras has HW 0.44 and the infradental lamella is more expanded, forming two convexities below the tooth, separated by a narrow notch. Two queens from the Metzabok Reserve in eastern Chiapas are distinctly different. One of them has HW 0.44 and an infradental lamella like the queens from Guatemala. The other queen has HW 0.54 and infradental lamella like the queen from Honduras. Thus there is the potential for multiple cryptic species in *R. weberi*. LaPolla *et al.* (2006) report *R. weberi* from Guyana, but this identification is incorrect. The single specimen (examined) cannot be clearly assigned to genus: it has the habitus of the *R. isthmica* clade, but the mandible and labrum are like species in the genus *Octostruma* Forel, 1912.

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