

Taxonomy and systematics

Taxonomic revision and distribution of the cleptoparasitic bee genus *Mesoplia* (Apidae: Ericrocidini) from Mexico and Central America

Revisión taxonómica y distribución de las abejas cleptoparásitas del género Mesoplia (Apidae: Ericrocidini) de México y Centroamérica

José Ángel Zamarripa-Fernández ^{a, b, *}, Ismael Hinojosa-Díaz ^c,
Moisés Armando Luis-Martínez ^d, Ricardo Ayala ^a

^a Universidad Nacional Autónoma de México, Instituto de Biología, Estación de Biología Chamela (Sede Colima), Km 59, Carr. Fed. 200, Melaque - Pto. Vallarta, La Huerta, 48895 Chamela, Jalisco, Mexico

^b Universidad Nacional Autónoma de México, Posgrado en Ciencias Biológicas, Edificio D, 1°Piso, Circuito de Posgrados, Ciudad Universitaria, Coyoacán, 04510 Ciudad de México, Mexico

^c Universidad Nacional Autónoma de México, Instituto de Biología, Departamento de Zoología, 3er. Circuito Exterior s/n, Ciudad Universitaria, Coyoacán, 04510 Ciudad de México, Mexico

^d Universidad Nacional Autónoma de México, Facultad de Ciencias, Departamento de Biología Evolutiva, Museo de Zoología "Alonso L. Herrera", Circuito Exterior s/n, Ciudad Universitaria, Coyoacán, 04510 Ciudad de México, Mexico

*Corresponding author: josea_zamarripa.fdez@comunidad.unam.mx (J.Á. Zamarripa-Fernández)

Received: 12 August 2024; accepted: 9 December 2024

<http://zoobank.org/urn:lsid:zoobank.org:pub:2D8547C4-6432-419B-9361-3D7076FD0267>

Abstract

A taxonomic revision of the cleptoparasitic bee genus *Mesoplia* Lepeletier, 1841 from Mexico and Central America is presented. We recognize 4 new species, resulting in a total of 10 species for the study area: *Mesoplia* (*Mesoplia*) *insignis* (Smith, 1879), *M. (M.) sapphirina* Melo & Rocha-Filho, 2011, *M. (M.) regalis* (Smith, 1854), *M. (M.) dugesi* (Cockerell, 1917), *M. (M.) rufipes* (Perty, 1933), *M. (M.) veracruzana* sp. nov., *M. (M.) oaxacana* sp. nov., *M. (M.) tica* sp. nov., *M. (Eumelissa) ornata* (Spinola, 1841) and *M. (E.) carmelitae* sp. nov. We propose the following synonymies: *M. imperatrix* (Fries, 1913) = *M. (M.) insignis*, and *M. guatemalensis* (Cockerell, 1912) = *M. (M.) rufipes*. We describe the previously unknown female of *M. (M.) dugesi* and provide diagnoses for both sexes based on the holotype. An identification key for the species, illustrations, distributional records (available as supplementary material), and lists of hosts and floral associations are provided.

Keywords: Brood parasite; Centridini; New species; Mesoamerica; Neotropical bees; Taxonomic key

Resumen

Se presenta una revisión taxonómica del género de abejas cleptoparásitas *Mesoplia* Lepeletier de México y Centroamérica. Se reconocen 4 especies nuevas, dando un total de 10 especies para el área en estudio: *Mesoplia* (*Mesoplia*) *insignis* (Smith, 1879), *M. (M.) sapphirina* Melo & Rocha-Filho, 2011, *M. (M.) regalis* (Smith, 1854), *M. (M.) dugesi* (Cockerell, 1917), *M. (M.) rufipes* (Perty, 1933), *M. (M.) veracruzana* sp. nov., *M. (M.) oaxacana* sp. nov., *M. (M.) tica* sp. nov., *M. (Eumelissa)* *ornata* (Spinola, 1841) y *M. (E.) carmelitae* sp. nov. Se encontraron las siguientes sinonimias: *M. imperatrix* (Friese, 1913) = *M. (M.) insignis* y *M. guatemalensis* (Cockerell, 1912) = *M. (M.) rufipes*. Se describe la hembra de *M. (M.) dugesi*, previamente desconocida, y se proporcionan las diagnósicos para ambos sexos basados en el tipo. Se aportan una clave de identificación de las especies, ilustraciones, registros de distribución (disponible como material complementario), una lista de huéspedes y asociaciones florales.

Palabras clave: Parásito de cría; Centridini; Nuevas especies; Mesoamérica; Abejas neotropicales; Clave taxonómica

Introduction

The tribe Ericrocini is composed mainly of cleptoparasitic bees that have Neotropical affinity, with the exception of the genus *Ericrocis* Cresson, 1887, which is Nearctic (Martins et al., 2018). The greatest diversity occurs in the Amazon region (Silveira et al., 2002; Snelling & Brooks, 1985). Their known hosts are species of the tribe Centridini (Rocha-Filho et al., 2009). The most easily recognizable morphological character of the tribe is the large, bifurcate or multidentate apex of the middle tibial spur (Michener, 2007).

The genus *Mesoplia* Lepeletier, 1841 is the richest in the tribe with 19 described species (Table 1), although it is estimated that it could include more species (Rozen et al., 2011). It is distributed from northern Mexico (Sinaloa and Tamaulipas) to Argentina (Snelling & Brooks, 1985). *Mesoplia* is recognized by the following characters: internal orbits more or less parallel; presence of 2 tubercles on the scutellum of variable development; meso and metabasitarsus without lateral patches of short, flattened setae; tiny metallic scales blue or green, mainly in the dorsal area of the metasoma, frequently also with patches of yellowish or whitish pubescence; S5 of male evidently emarginated and hidden under S4 (Genaro & Breto, 2022; Michener, 2007; Snelling & Brooks, 1985; Vivallo, 2010).

The subgeneric classification was proposed by Snelling and Brooks (1985). They proposed 2 subgenera based on morphological characters, *Mesoplia* and *Eumelissa*. Males of the former have posterior tibial spurs that do not extend beyond the basal third of the basitarsus, the posterior tibia has an internal distal patch of setae and S5 evidently emarginate and hidden under S4. Females of the same subgenus have a broad pygidial plate, which occupies the exposed dorsal surface of T6, covered with setae or scales and dorsal surface of posterior coxa angulate or carinate at the junction with the lateral surfaces. In contrast, males

of the subgenus *Eumelissa* have long posterior tibial spurs reaching to or beyond middle of basitarsus. Females of the same subgenus have narrow pygidial plate, does not completely occupy the exposed dorsal surface of T6, without scales or setae and dorsal surface of posterior coxa abruptly rounded at the junction with lateral surfaces (Michener, 2007). Furthermore, Moure (1960a, b) recognizes 2 groups: *bifrons* and *azurea*, both of which are part of the subgenus *Mesoplia* s. str. Males of the *bifrons* group have conspicuous hind tibia setal brush, 2 spurs on the posterior tibia, ventral basal surface of posterior femur without a robust posterior projection. Females have pronotum without a carina extending laterally from the pronotal collar to the pronotal lobe. On the other hand, males of the *azurea* group have inconspicuous hind tibia setal brush, 1 spur on the posterior tibia and ventral basal surface of posterior femur with a robust posterior projection. Females of this group have pronotum with a carina extending laterally from the pronotal collar to the pronotal lobe.

The known hosts include several species of Centridini (Rocha-Filho et al., 2009). For *Mesoplia*, as in the rest of the tribe, the biology of most species is practically unknown and their geographical distribution uncertain, since some of the information available in the literature is based on mistaken identifications (Vivallo, 2014).

In this work we update the knowledge of the species of *Mesoplia* for Mexico and Central America, providing diagnoses, descriptions, distributional data, identification keys, and a summary of floral and host records. We describe 4 new species and establish 2 new synonyms.

Materials and methods

We reviewed 363 specimens from the following collections where studied specimens are deposited (names of curators and/or collection managers are in parentheses): EBCh, Estación de Biología Chamela, IBUNAM, Jalisco,

Table 1

Recognized species of *Mesoplia* Lepeletier, 1841. * New synonyms.

Subgenus	Group	Species	Known sex	General distribution
<i>Mesoplia</i>	<i>bifrons</i>	<i>Mesoplia bahamensis</i> Genaro & Breto, 2022	Male	Bahamas
		<i>Mesoplia bifrons</i> (Fabricius, 1804)	Male	Guyana
		<i>Mesoplia cubensis</i> Genaro & Breto, 2022	Both	Cuba and Isla de la Juventud
		<i>Mesoplia imperatrix</i> (Fries, 1913)*	-	-
		<i>Mesoplia insignis</i> (Smith, 1879)	Both	Mexico
		<i>Mesoplia pilicrus</i> (Fries, 1902)	Both	Haiti and Dominican Republic
		<i>Mesoplia regalis</i> (Smith, 1854)	Both	Panama to Brazil
		<i>Mesoplia sapphirina</i> Melo & Rocha-Filho, 2011	Both	Mexico to Panama
		<i>Mesoplia simillima</i> Schrottky, 1920	Male	Brazil and Paraguay
		<i>Mesoplia tica</i> sp. nov.	Both	Costa Rica
	<i>azurea</i>	<i>Mesoplia veracruzana</i> sp. nov.	Female	Mexico
		<i>Mesoplia azurea</i> (Lepeletier & Audinet-Serville, 1825)	Both	Dominica, Guadeloupe, Martinique and Saint Vincent
		<i>Mesoplia chalybaea</i> (Fries, 1912)	Both	Brazil
		<i>Mesoplia dugesi</i> (Cockerell, 1917)	Both	Mexico
		<i>Mesoplia guatemalensis</i> (Cockerell, 1912)*	-	-
		<i>Mesoplia oaxacana</i> sp. nov.	Female	Mexico
		<i>Mesoplia rufipes</i> (Perty, 1833)	Both	Mexico to South America
		<i>Mesoplia alboguttata</i> (Ducke, 1905)	Both	Bolivia and Brazil
		<i>Mesoplia carmelitae</i> sp. nov.	Both	México and Costa Rica
		<i>Mesoplia decorata</i> (Smith, 1854)	Both	Brazil, Ecuador, Guatemala, Panama and Venezuela
<i>Eumelissa</i>		<i>Mesoplia friesei</i> (Ducke, 1902)	Both	Brazil, Colombia and Paraguay
		<i>Mesoplia guedesii</i> (Ducke, 1902)	Female	Brazil
		<i>Mesoplia ornata</i> (Spinola, 1841)	Both	Mexico to French Guiana

Mexico (R. Ayala Barajas); CNIN, Colección Nacional de Insectos, Instituto de Biología, UNAM, Mexico City (I.A. Hinojosa Díaz); MZFC, Museo de Zoología “Alfonso L. Herrera”, Facultad de Ciencias, UNAM, Mexico City (M.A. Luis Martínez); CZUG, Centro de Estudios en Zoología, CUCBA, Universidad de Guadalajara, UDG, Jalisco, Mexico (José Luis Navarrete, Hugo Fierros); HFL, Colección Particular de Hugo Eduardo Fierros López, Jalisco, Mexico (Hugo Fierros); IEXA, Colección Entomológica del Instituto de Ecología, A.C., INECOL, Veracruz, Mexico (Jorge E. Valenzuela, Viridiana Vega); ECOAB, Colección de Abejas de El Colegio de la Frontera Sur, Chiapas, Mexico (Rémy Vandame, Jorge A. Mérida Rivas, Philippe Sagot); CER-UADY, Colección Regional Entomológica de la Universidad Autónoma de Yucatán,

UADY, Yucatán, Mexico, (Virginia Meléndez Ramírez, María José López Gómez); SEMC, Snow Entomological Collection, Division of Entomology, University of Kansas Natural History Museum, KU, Lawrence, Kansas, USA (Zachary Falin, Michael Engel, Rachel Osborn); MNCR, Museo Nacional de Costa Rica, Heredia, Costa Rica (Maricelle Méndez, Marcela Sánchez); MZUCR, Museo de Zoología, Universidad de Costa Rica, San José, Costa Rica (Mauricio Fernández, Paul Hanson); CINAT,

Centro de Investigaciones Apícolas Tropicales, Universidad Nacional de Costa Rica, UNA, Heredia, Costa Rica (Mario Gallardo, Eduardo Herrera).

Type specimens of *M. sapphirina* were studied. For the rest of the species high-resolution images of holotypes were available, which allowed verification of the species

that were delimited and that had been previously described: for *M. insignis* (both sexes) and *M. regalis* on the website of the Natural History Museum (London, England); the holotype of *M. dugesi* on the website of the National Museum of Natural History, Smithsonian Institution (Washington D.C., USA); for *M. imperatrix* images of holotype from the Museum für Naturkunde (Berlin, Germany) were provided by Stefanie Krause; and the holotype images of *M. guatemalensis* from the American Museum of Natural History (New York, USA) were provided by Corey Smith. Delimitation of other species followed original descriptions and specimens previously identified by taxonomists who worked with the genus and compared their specimens with types deposited in the mentioned collections. Due to the morphological characteristics of the species of this genus, it is possible to be certain of their identification.

Morphological terminology follows Michener (2007); for integument sculpture we follow Harris (1979). Metasomal terga and sterna are designated as T and S respectively, numbered from anterior to posterior. We used F for antennal flagellum, with F1 following the pedicel. Male genitalia were dissected along with S7 and S8. The subgeneric classification follows Snelling and Brooks (1985) and the classification of groups follows Moure (1960a). All measurements are given in millimeters (mm). Images for most of the structures and habitus were taken with a Leica MC 170 HD camera adapted to a Leica M205C stereoscopic microscope except some of the habitus photographs were taken with a Cannon EOS 70D DSLR camera and a Canon EF-S 60 mm macro lens. For *Mesoplia tica* sp. nov., images were taken using an Olympus DP74 camera attached to an Olympus SZX16 stereoscopic microscope. Images were processed with Adobe Photoshop CS5®, Photopea.com, HeliconSoft and Leica Application Suite. The scale bar indicates 0.5 mm in the genitalia images. Distribution maps were produced from specimen locality data (available as supplementary material) using QGIS software and the base map of Esri Physical and were prepared by the first author. Geospatial coordinates are presented in DMS. Plant associations were based on the information present in the specimen label. For the cleptoparasite-host associations we reviewed and compiled the published information categorized following Rocha-Filho et al. (2009).

Description

We recognize 10 species of *Mesoplia* for Mesoamerica; 4 are new to science herein described and illustrated. In addition, 2 synonyms are recognized, *Mesoplia imperatrix* (Fries, 1913) = *M. insignis* (Smith, 1854) and

M. guatemalensis (Cockerell, 1912) = *M. rufipes* (Perty, 1833).

Genus *Mesoplia* Lepeletier, 1841

Mesoplia Lepeletier, 1841: 457. Type species: *Mesocheira azurea* Lepeletier & Serville, 1825: Museo Regionale di Scienze Naturale, Torino, Italy (♀♂), monobasic.

Melissa Smith, 1854: 279. Type species: *Mesocheira azurea* Lepeletier & Serville, 1825, designated by Sandhouse, 1943: 570.

Diagnosis. Maxillary palps elongated, with 3 or 4 segments; internal orbits more or less parallel; scutellum bituberculate (in some species not very evident); medial basitarsus with a flattened distal process on the posterior margin, more evident in females (Figs. 1, 2); dorsal region of the metasoma covered with tiny scales that give it a metallic blue or green color, regularly with small patches of yellow or white pubescence; S5 of the male evidently emarginate and hidden under S4; body length from 10 to 25 mm.

Subgenus *Mesoplia* Lepeletier, 1841

Diagnosis. Male: distal inner surface of the posterior tibia with a setal brush, not very evident in some species (Fig. 3A-E); hind tibial spurs not reaching beyond basal third of basitarsus, some species with only 1 spur present. Female: pygidial plate broad, occupying the exposed dorsal surface of T6; pygidial plate covered with scales or setae (Fig. 4A-G); dorsal surface of posterior coxa angulate or carinate at the junction with the lateral surfaces.

M. bifrons group (*sensu* Moure, 1960a, b)

Diagnosis. Male: hind tibia with setal brush conspicuous (Fig. 3A-C) and 2 spurs; posterior femur with ventral basal margin without a robust posterior projection; posterior basitarsus with inner surface without a longitudinal carina. Female: without a carina between pronotal collar and the pronotal lobe (Fig. 5A).

Mesoplia (Mesoplia) insignis (Smith, 1879)

(Figs. 3A, 4A, 5A, 6, 7A, 8-10, 35)

Melissa insignis Smith, 1879: 108. Syntypes: British Museum Natural History, London, England (♀♂). Type locality: Mexico, Veracruz, Orizaba.

Melissa imperialis Fries, 1912: 205. Holotype: Museum für Naturkunde, Berlin, Germany (♀). Type locality: Mexico, Morelos. New junior synonym.

Melissa imperatrix Fries, 1913: 89. *nom. nov.* for *Melissa imperialis* Fries, 1912. New junior synonym.

Melissa imperatrix Fries, 1921: 266. *nom. nov.* for *Melissa imperialis* Fries, 1912. New junior synonym.

Diagnosis. Male: metallic greenish body, with pubescence on head and mesosoma mostly bright yellow;

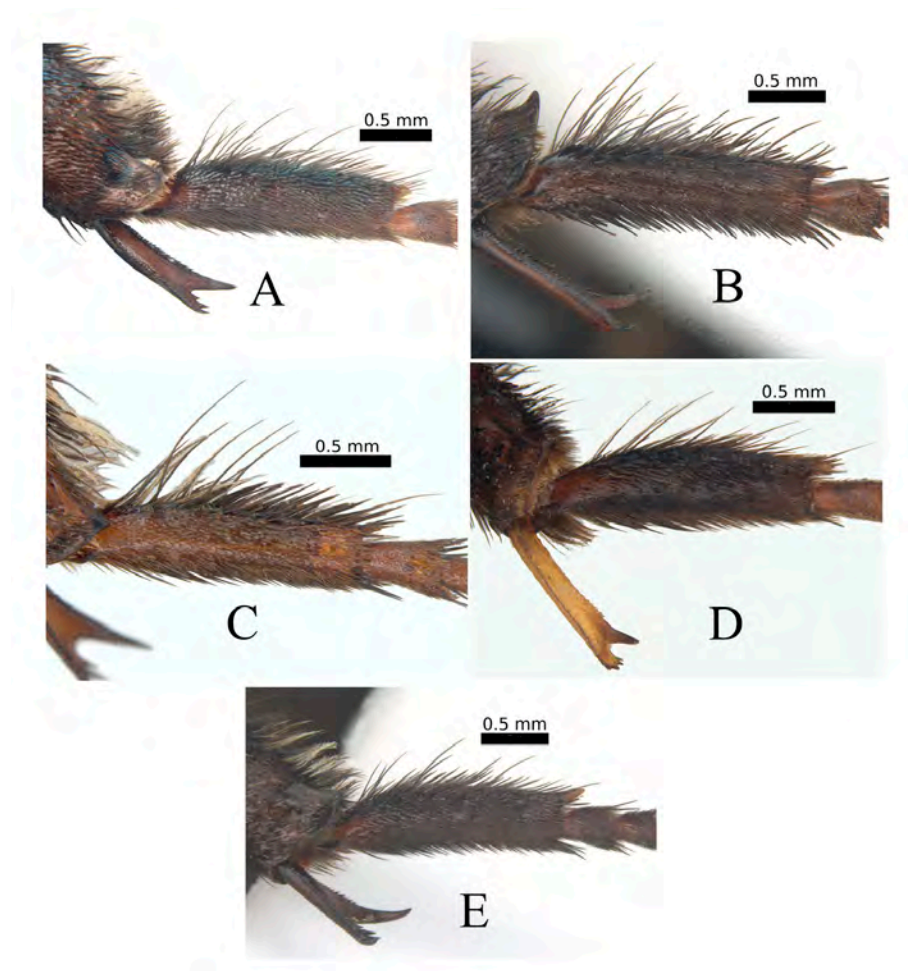


Figure 1. Middle leg basitarsus, male: A, *Mesoplia (M.) sapphirina*. B, *Mesoplia (M.) dugesi*. C, *Mesoplia (M.) rufipes*. D, *Mesoplia (E.) carmelitae* sp. nov. E, *Mesoplia (E.) ornata*.

integument of antenna, pronotal lobe, tegula and legs black; scutellar tubercles conical, inconspicuous due to dense pubescence (Fig. 6D), with perceptible cleft between them; robust forked medial tibial spur, with dark integument, wide anterior projection and with between 2 and 4 internal teeth; pubescence of the terga mainly whitish with a spot of bright yellow pubescence on both lateral margins of T1, at least also present in T2 (Fig. 6A); surface of T7 without scales but with black pubescence; apex of T7 slightly forked, both apices truncated and bare at tip (Fig. 7A); S4 shallowly emarginate, with several rows of compound pubescence on the apical margin, dark in color in the center and becoming light at the laterally; digitiform lobe of the gonostylus triangular and broad, projecting upwards (Fig. 8C, D).

Female: body dark metallic blue and black pubescence, but with some small patches of whitish pubescence behind the antennal area, preoccipital area, lateral margins of the scutum to the level of tegula, and lateral margins of S2-S4 (Fig. 9A-C); black integument on antenna pronotal lobe, tegula and legs; scape with dark metallic blue; integument of scutum and tegula with scales that give a dark metallic blue appearance; scutellar tubercles mamilliform; tergal pubescence mainly dark; ventral surface of mesosoma and metasoma with metallic blue scales; middle tibial spur robust with black integument, forked, anterior projection with 1 to 4 internal teeth; pygidial plate with a broad and quadrangular apex, without scales on the surface, with blackish pubescence that does not reach the apex, black integument (Fig. 4A).

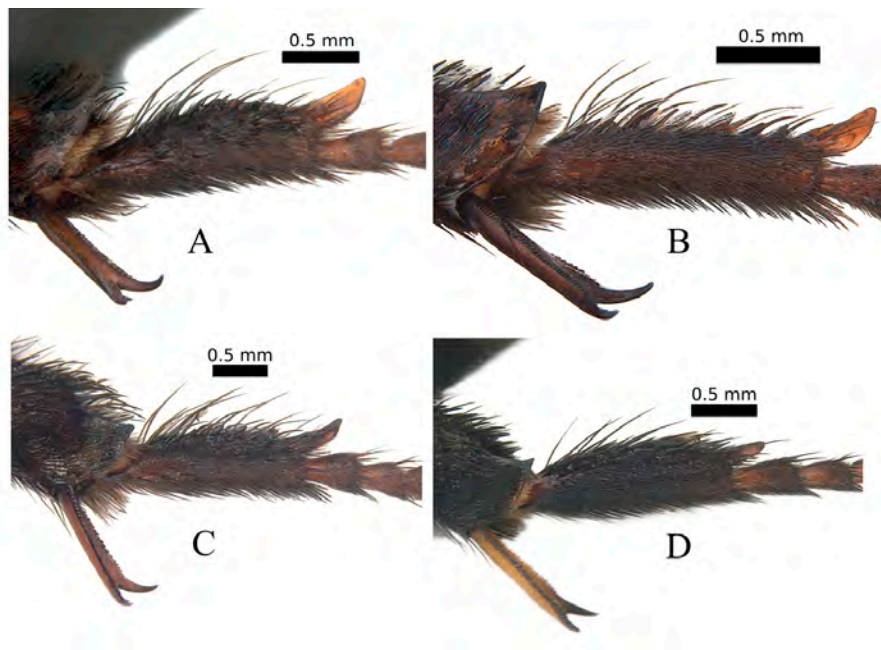


Figure 2. Middle leg basitarsus, female: A, *Mesoplia (M.) sapphirina*. B, *Mesoplia (M.) rufipes*. C, *Mesoplia (M.) oaxacana* sp. nov. D, *Mesoplia (E.) carmelitae* sp. nov.

Variation. Some females from Morelos with white setae on lateral edges of the labrum and posterolateral edges of the propodeum. Pubescence and the presence of metallic scales in some body areas of males seem to be relatively variable, labral setae can be yellow, whitish or dark; the clypeus may have yellow setae or metallic blue scales, as well as the dorsal surface of the scutellar tubercles.

Taxonomic summary

Material examined. Mexico: Jalisco: 22.5 km al NE de Magdalena, 20°58'46.17" N, 104°6'52.33" W, 1,066.8 m, 19-VII-1953, Univ. of Kans. Mex. Exped., 1♂ (SEMC 1254912); Tala, Bosque Escuela, 20°35'44.9988" N, 103°38'15" W, 1,499 m, 7-IX-2012, H. E. Fierros-López, 1♀ (CZUG); ANP Bosque la Primavera, S. Nopales, 20°36'3.4" N, 103°38'20.4" W, 1,500 m, 26-IX-2013, O. Serrano-Pineda, 1♀ (CZUG); Tequila, Volcán de Tequila, 20°51'52" N, 103°50'36" W, 1,300 m, 29-VII-1995, H. E. Fierros-López, 1♀ (CZUG 580); 20°49'36" N, 103°50'45" W, 1,300 m, 29-VIII-1995, H. E. Fierros-López, 1♀ 1♂ (HFL), 20°51'36" N, 103°51'0" W, 1,370 m, 12-VI-2022, K. Sanchez, 1♂ (ECOAB 87968); Tlajomulco de Zúñiga, Fraccionamiento Nueva Galicia coto Valencia, 20°34'39" N, 103°26'40" W, 1,618 m, 24-IX-2022, J. A. Zamarripa-Fernández, C. Sánchez-Bastidas e I. I. Alfaro-

Ríos, 5♀ (CZUG); Zapopan, Barranca la Experiencia, 20°57'42.804" N, 103°24'5.292" W, 1,300 m, 14-IX-1996, G. Mercado, 1♀ (CZUG 1112), 1♂ (CZUG 1113), 22-VIII-2009, G. Mercado, 1♀ (CZUG EXP0440), 1♂ (CZUG EXP0446), 5-IX-2009, G. Mercado, 1♂ (CZUG EXP0445), 1,350 m, 29-VII-2009, G. Mercado, 1♂ (HFL), 29-VII-2009, G. Mercado, 1♂ (CZUG); Parque ecológico Huilotán, 20°57'42.804" N, 103°24'5.292" W, 1,121 m, 7-IX-2023, J. A. Zamarripa-Fernández, C. Morales & J. M. Sandoval, 3♀ 4♂ (CZUG). Morelos: Jojutla de Juárez, Cerro del Higuierón, 18°34'0.3876" N, 99°9'55.2816" W, 1,060 m, 26-VII-1981, C. Deloya, 1♀ (MZFC 28612); Yautepec de Zaragoza, 18°50'55.6116" N, 99°4'42.0888" W, 1,249 m, 15-XI-1980, J. M. Labougle, 4♀ (CNIN 3042-3045) 2♂ (CNIN 3046; 3047). Oaxaca: Santo Domingo Tehuantepec, 17 km W of Tehuantepec, 16°21'59.328" N, 95°22'59.088" W, 8-IX-1965, D. Janzen, 2♂ (SEMC 1254910; 1254911).

Distribution. This species is endemic to Mexico and distributed from the center of country to the north of the Isthmus of Tehuantepec (Fig. 10) between 1,060-1,616 m of altitude, a distribution that corresponds to the Trans-Mexican Volcanic Belt and Sierra Madre del Sur.

Taxonomic comments. This species is morphologically similar to *Mesoplia tica* sp. nov. Males differ in the apex of T7 slightly forked with both apices truncated and bare

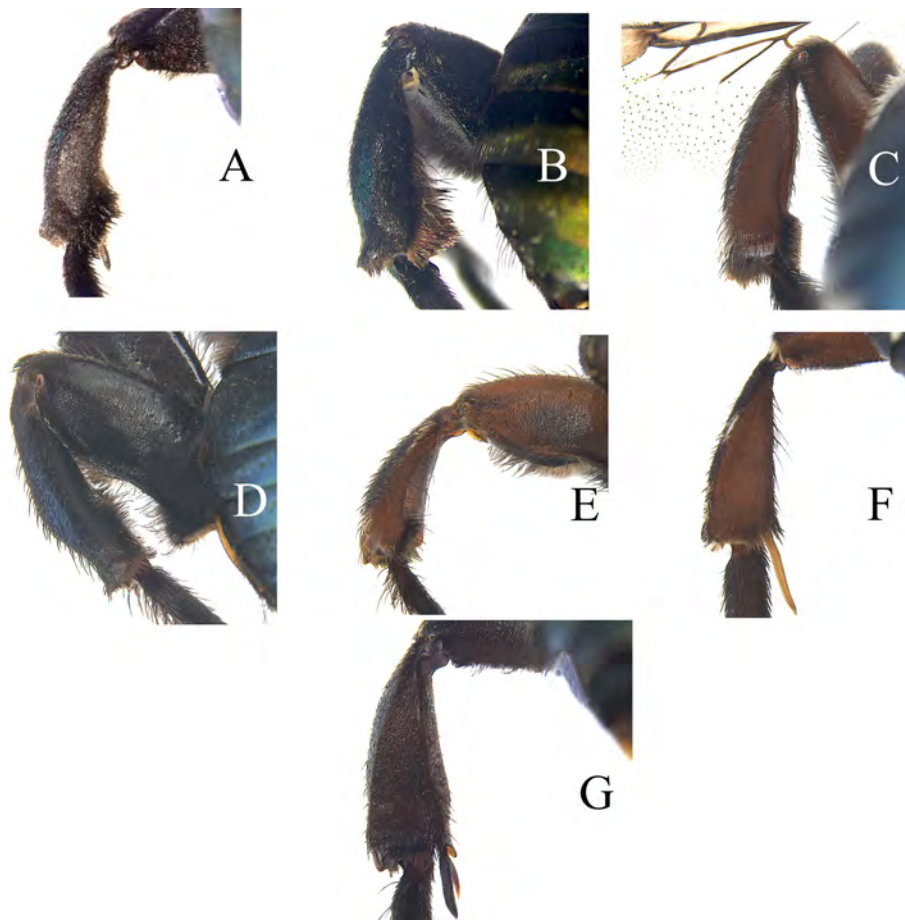


Figure 3. Hind leg, male: A, *Mesoplia (M.) insignis*. B, *Mesoplia (M.) tica* sp. nov. C, *Mesoplia (M.) sapphirina*. D, *Mesoplia (M.) dugesi*. E, *Mesoplia (M.) rufipes*. F, *Mesoplia (E.) carmelitae* sp. nov. G, *Mesoplia (E.) ornata*.

at tip (Fig. 7A), and the pubescence of the mesosoma almost entirely bright yellow (Fig. 6). The female pygidial plate has a broadly quadrangular apex, with blackish pubescence on the surface (Fig. 4A), and the scutellar tubercles are less projected upward than in *Mesoplia tica* sp. nov.

Mesoplia (Mesoplia) tica Zamarripa-Fernández & Ayala sp. nov.

<http://zoobank.org/urn:lsid:zoobank.org:act:AA210F3F-809C-442E-8EF8-62160B7E0991>

(Figs. 3B, 4B, 7B, 10-13, 35)

Diagnosis. Male: metallic greenish body, with bright yellow pubescence on the clypeus, anterior surface of the mesepisternum, pronotal lobe, anterior region of the scutellar disc, posterior region of the scutellum, scutellum and lateral areas of the propodeum (Fig. 11); tegula with black setae on inner anterior and posterior edge; scutellar

tubercles conical and strongly projecting upwards, with a perceptible cleft between them; robust forked medial tibial spur, with blackish integument, wide anterior projection and with between 3 and 4 internal teeth; tergal pubescence mainly whitish, with a spot of bright yellow pubescence on both lateral margins of T1 (Fig. 11B); tergal scales metallic greenish-copper; apex of T7 noticeably forked, both apices rounded (Fig. 7B); dorsal lobe of gonostyle triangular and broad projected upwards (Fig. 12C, D).

Female: body dark metallic and blue pubescence, with scales blue-greenish on head and mesosoma, and metallic blue to the metasoma; with patches of whitish pubescence on labrum, anterior lateral edges of the clypeus, behind the antennal insertion, preoccipital region, upper region of the gena, lateral surface of the mesepisternum, lateral margins of the scutum at the level of the tegula, posterior region of the scutellum, lateral apex of T5 and lateral apices of S2-S4 (Fig. 13); black integument on antenna, pronotal

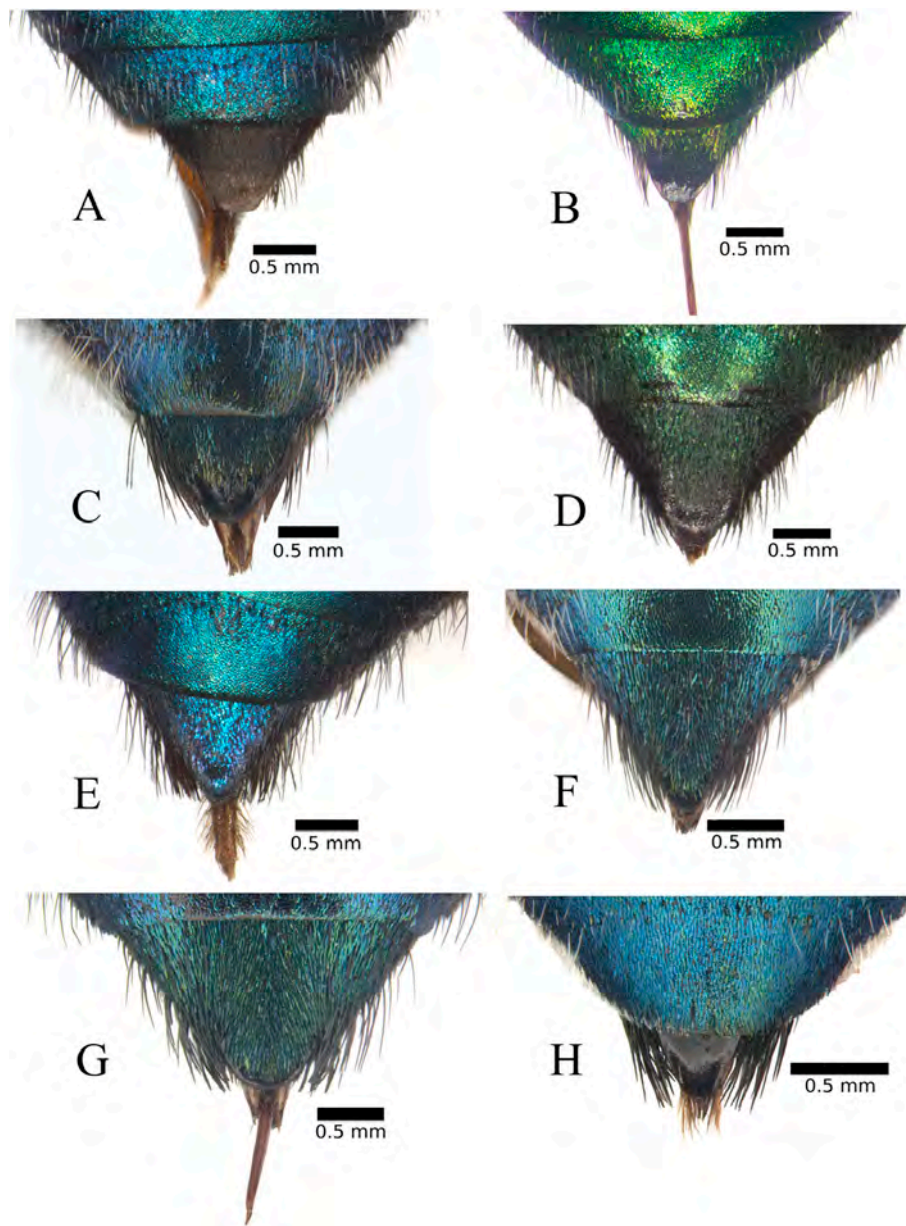


Figure 4. Pygidial plate, female: A, *Mesoplia (M.) insignis*. B, *Mesoplia (M.) tica* sp. nov. C, *Mesoplia (M.) sapphirina*. D, *Mesoplia (M.) veracruzana* sp. nov. E, *Mesoplia (M.) dugesi*. F, *Mesoplia (M.) rufipes*. G, *Mesoplia (M.) oaxacana* sp. nov. H, *Mesoplia (E.) carmelitae* sp. nov.

lobe, tegula and legs; scape with blue-green scales; tegula with metallic blue scales; scutellar tubercles subconical, strongly projecting upwards (Figs. 13A, D, 35C); middle tibial spur robust with black integument, forked, anterior projection with 2 to 3 internal teeth; pygidial plate with apex more or less rounded, with scales on the surface that do not reach the apex, and black integument (Fig. 4B).

Description. Holotype: male. Body length 17.5 mm, forewing length 13.4 mm, head length 4.2 mm, intertegular distance 4.3 mm, T2 length 2.5 mm. Head: mandible with an internal tooth. Labrum subrectangular, concave surface, with a very evident preapical margin. Ocelli aligned to the upper margin of the eyes, protruding above the head in lateral view. Mesosoma: convex scutum in lateral view.

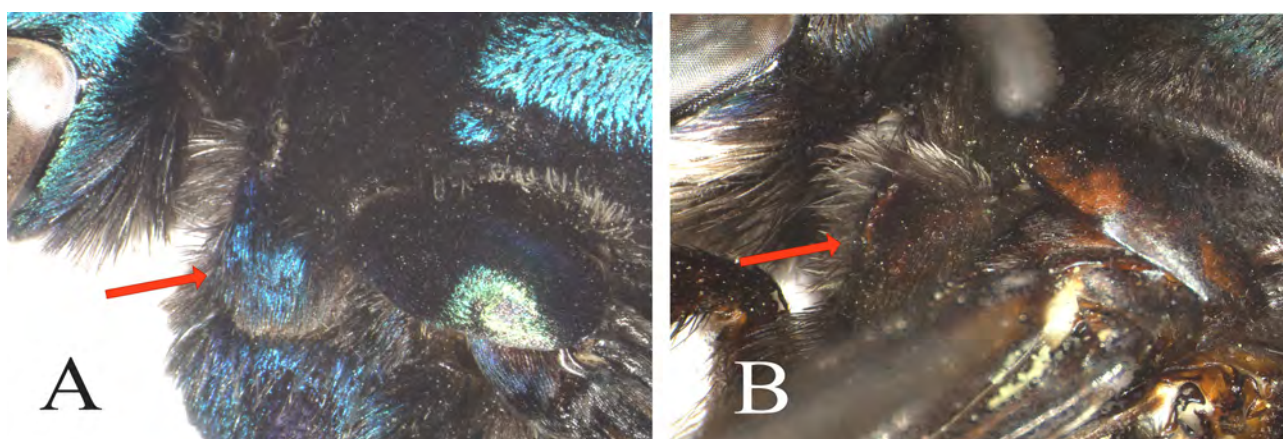


Figure 5. Pronotal lobe, female: A, *Mesoplia (M.) insignis*. B, *Mesoplia (M.) dugesi*.

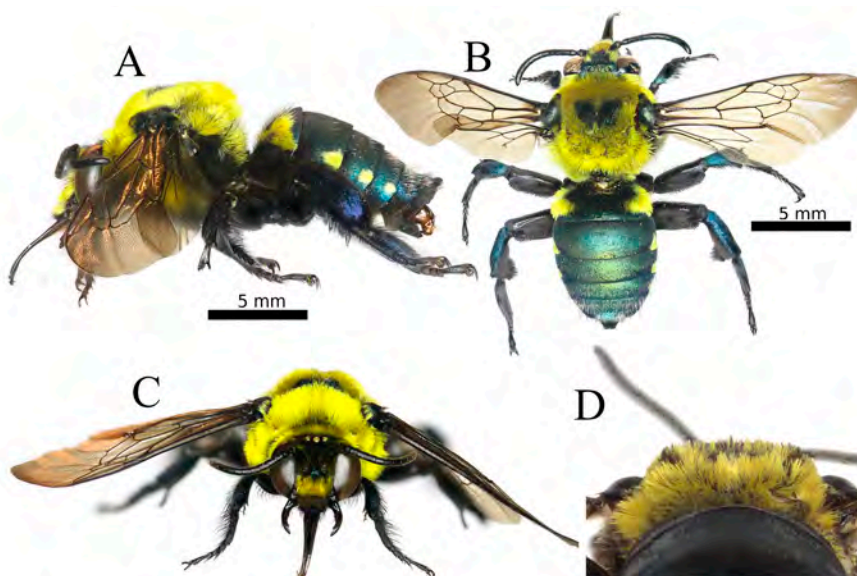


Figure 6. *Mesoplia (M.) insignis*, male. A, Lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

Scutellar tubercles conical, strongly projecting upwards, cleft between them evident. Vertical metanotum and propodeum. Middle tibial spine rounded and short. Medial tibial spur robust forked, anteriorly projecting with 3 to 4 internal teeth. Middle basitarsus with posterior margin smooth and with short and straight flattened distal process. Hind tibia with 2 short spurs at the inner apex. Metasoma: T7 with a flattened surface, noticeably forked apex, with a moderately deep central cleft, medium distance between the apices, both ends rounded. Color: in general, with black integument. Head: labrum, rostrum, scape, pedicel and

f1 black, remainder of flagellum greyish. Mandible with apical third yellowish brown, the rest black. Mesosoma: pronotal lobe, tegula, wing veins, legs, middle tibial spur, black. With smoked wings. Forewings without dark spots evident. Metasoma: with black sternum. Surface sculpture: head, labrum with most of surface rugose, by basal edge polished. Mesosoma: tegula with stippling. The propodeum strigulate. Pubescence: black and bright yellow. Head: labrum central surface with white plumose setae and scattered simple black setae, lower edge with a pair of long black tufts, lateral edges with simple black

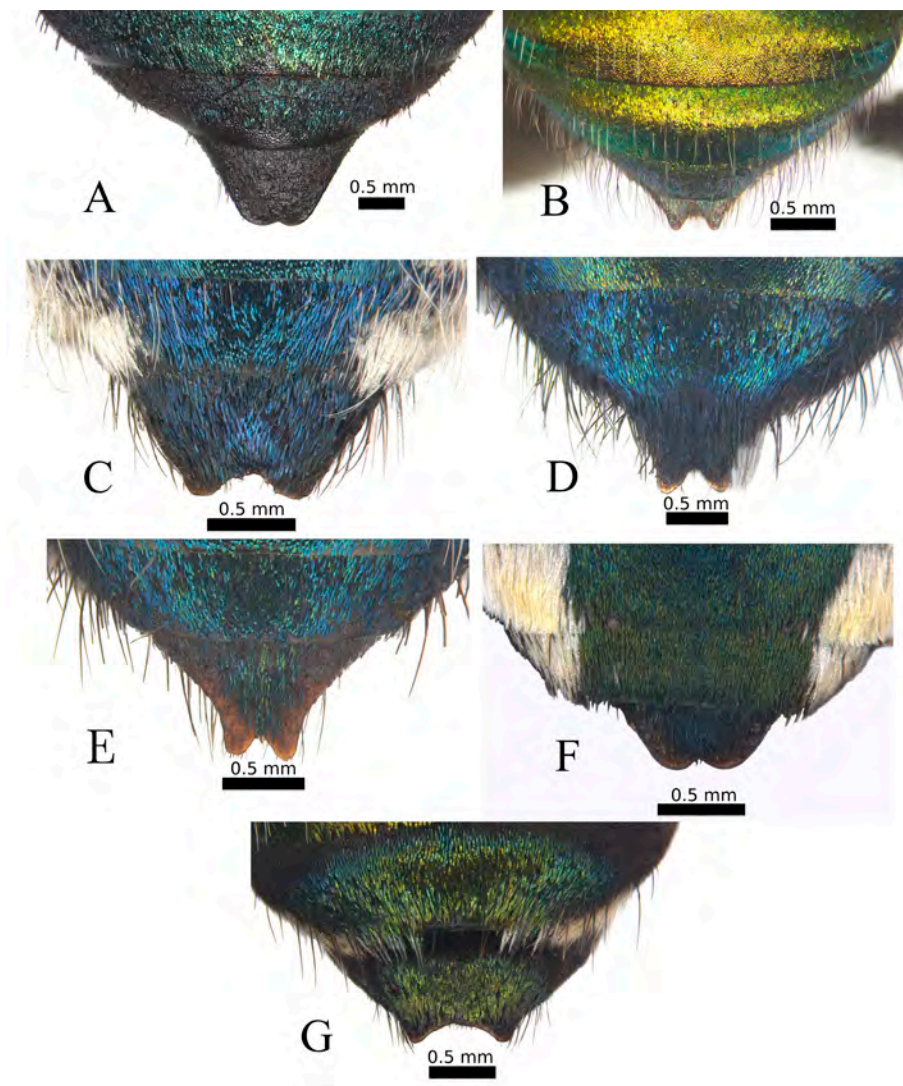


Figure 7. T7, male: A, *Mesoplia (M.) insignis*. B, *Mesoplia (M.) tica* sp. nov. C, *Mesoplia (M.) sapphirina*. D, *Mesoplia (M.) dugesi*. E, *Mesoplia (M.) rufipes*. F, *Mesoplia (E.) carmelitae* sp. nov. G, *Mesoplia (E.) ornata*.

setae, upper edge bare. Clypeus densely covered with bright yellow plumose setae. Supraclypeal area, forehead close to the lower edge of the ocelli and vertex with metallic bluish-green scales. Supraclypeal area with black setae. With a spot of bright yellow setae in the upper part of the paraocular area. Preoccipital region and upper gena region with bright yellow setae. Lower region of the gena with black setae. Mesosoma: anterior surface of the mesepisternum, pronotal lobe, region anterior to the central disc of the scutum, posterior region of the scutellum, metascutum and lateral areas of the propodeum covered almost exclusively by bright yellow setae. The

rest covered by black setae. Central disc of the scutum and most of the surface of the tegula with metallic green scales. Both the anterior and posterior inner edges of the tegula with black setae. Naked propodeal triangle. Internal apex of posterior tibia with very evident short blackish setal brush (Fig. 3B). Metasoma: terga covered with metallic greenish-copper scales. Anterior edge of T1 with scattered simple black and white setae, with a spot of yellow pubescence on both lateral margins. Surfaces of T3 to T6 with several series of rows of simple black setae. S2 to S4 with a short white patch of pubescence on the lateral edges. Scattered black sternum setae. S4 with



Figure 8. *Mesoplia (M.) insignis*, male: A, S7. B, S8. C and D, genital capsule, dorsal and lateral view, respectively.

long, branched black setae near the posterior edge and with several rows of simple black setae on the surface. S2 to S4 with a more or less triangular white spot on the lateral margins; dorsal lobe of gonostyle triangular and broad projected upwards.

Allotype: female. Body length 16.8 mm, forewing length 12.6 mm, head length 4 mm, intertegular distance 4.5 mm, T2 length 2.3 mm. Head: mandible with an internal tooth; labrum subrectangular with flat surface, and with a very evident preapical margin; ocelli aligned to the upper margin of the eyes, protruding above the head in lateral view. Mesosoma: convex scutum in lateral view. Scutellar tubercles with the conical shape strongly projecting upwards, an evident cleft between them. Vertical metanotum and propodeum. Middle tibial spine pointed and short. Medial tibial spur robust forked, anteriorly projecting with 2 to 3 internal teeth. Medium basitarsus with slightly wavy posterior margin and a flattened curved distal process. Metasoma: pygidial plate with apex more or less rounded. Color: integument black.

Head: labrum, rostrum, scape, pedicel and F1 black, remainder of flagellum greyish. Apical third of mandible dark reddish brown with nearby yellowish brown spot, basal half black. Mesosoma: pronotal lobe, tegula, wing veins, legs, middle tibial spur, black. Apex of distal process of middle basitarsus dark reddish brown. Evenly smoked wings. Forewings without obvious dark spots. Metasoma: black sternum. Surface sculpture: head. Rugulous labrum. Mesosoma: finely punctuate tegula. Dotted propodeum. Metasoma: dotted pigdial plate. Pubescence: mainly black, but head covered mainly with white setae. Head: labrum surface with white setae branched and few scattered simple black setae, with a pair of tufts of black setae on the anterior margin and with setae on the lateral edges. Scape almost entire surface of anterior area with metallic blue-green scales. Mesosoma: covered mainly with black setae, except for patches of white setae on the collar of the pronotum, lateral region of the mesepisternum, lateral edges of the scutum, near the tegula, posterior region of the scutellum. Scales of the central disc of the scutum and

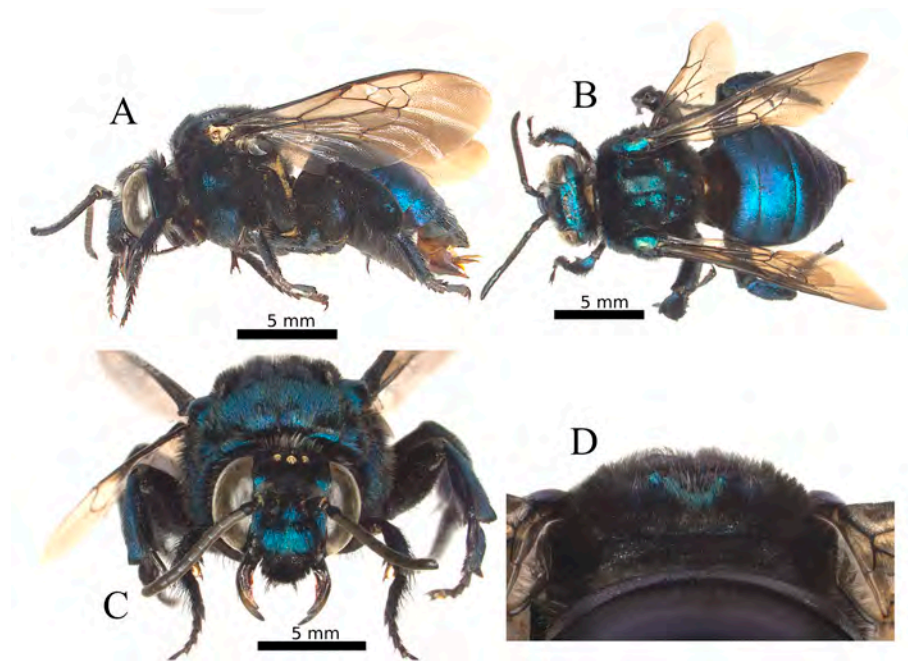


Figure 9. *Mesoplia (M.) insignis*, female: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

the pronotal lobe metallic blue-green, of the same tone as those of the face. Scales of the tegula, mesepisternum and scutellum metallic blue. Metasoma: virtually the entire surface covered with metallic blue scales and the setae present are almost exclusively black, except for a spot of branched white setae on the lateral edges of T1, several rows of simple white pubescence on the surface of T4 and T5, a triangular spot of short branched white pubescence on the lateral ends of S3 to S5 and another small spot on the lateral edge of T5. Sterna also with metallic blue scales. Pygidial plate with metallic scales on the surface.

Variation. Some males have bright yellow setae on the external surface of anterior tibia and little pale-yellow pubescence on the lateral edge of S4.

Taxonomic summary

Type material. Holotype: ♂ MNCR INB0004333459, CR. CART (Costa Rica, Cartago), Ochomongo, San Nicolás, Finca Kirqua, 9°54'41.29" N, 83°56'1.81" W, 14-II-2010/1-III-2010, W. Porras (MNCR). Allotype: ♀ MNCR INB0004333299, CR. HER [Costa Rica, Heredia], Sarapiquí, La Isla, 10°24'50.79" N, 84°7'42.24" W, 100-200 m, 22-II-2017/17-IV-2017, I. A. Chacón (MNCR). Paratypes: same data as the holotype ♀ MNCR INB0004333460 (MNCR), ♀ MNCR A5002767;

CR. ALAJ [Costa Rica, Alajuela], Virgen del Socorro, 10°17'0.20" N, 84°10'38.22" W, 750 m, 15-IX-1982, I. A. Chacón (MNCR); ♂ MNCR A5057872 CR. HER [Costa Rica, Heredia], Sarapiquí, Puerto Viejo, Estación Biológica La Selva, 10°25'50.61" N, 84°10'38.21" W, 61 m, 24-VI-1988, I. A. Chacón (MNCR), ♀ SEMC 1254906, 10°25'35.81" N, 84°1'1.16" W, 80 m, 19-V-1993, J. Ashe & A. Ashe (SEMC); ♀ MZUCR HY6823 CR. HER [Costa Rica, Heredia], Sarapiquí, Puerto Viejo, La Isla, 10°14'7.70" N, 83°54'43.45" W, 221 m, VI-2011/VII-2011, I. A. Chacón (MZUCR); ♀ CINAT JZ344 CR. HER [Costa Rica, Heredia], Sarapiquí, Puerto Viejo, La Tirimbina, 10°23'52.20" N, 84°8'9.16" W, 186 m, 1997, Sergio (CINAT), ♀ MNCR JZ357, same location as the previous one, 25-VI-1997, Posada (MNCR); ♀ MZUCR HY6827 CR. PUNT [Costa Rica, Puntarenas], Reserva Forestal Golfo Dulce, 24 km W. Piedras Blancas, 8°45'17.43" N, 83°29'5.51" W, 200 m, IV-1992/V-1992, P. Hanson (CINAT).

Etymology. The specific epithet *tica* refers to the demonym with which the inhabitants of Costa Rica recognize themselves.

Distribution. Registered only for Costa Rica and it is possible that this species be endemic to this country (Fig. 10), present between 61 to 750 m altitude.

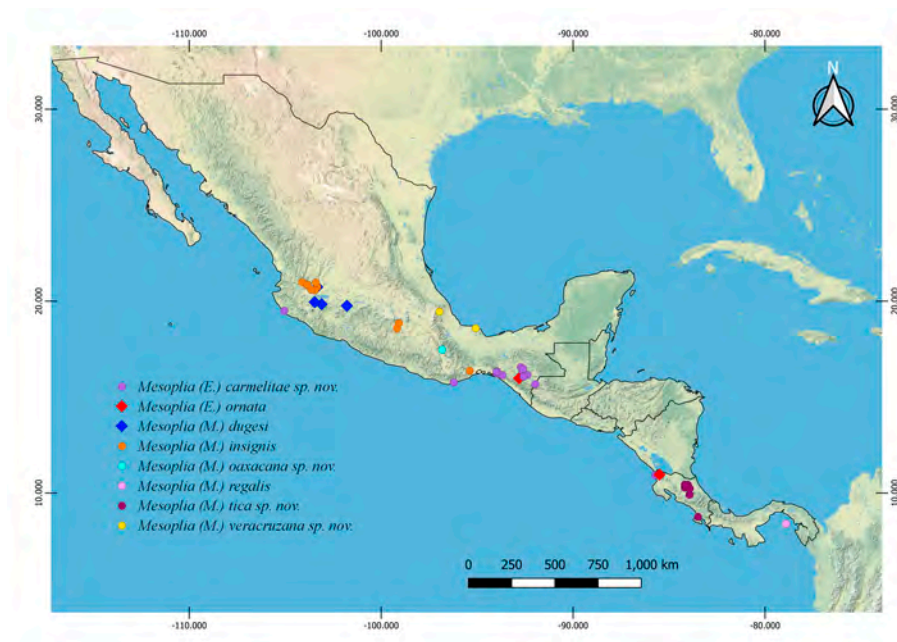


Figure 10. Map with the known distribution of *Mesoplia (Eumelissa) carmelitae* sp. nov., *M. (E.) ornata*, *M. (Mesoplia) dugesi*, *M. (M.) insignis*, *M. (M.) oaxacana* sp. nov., *M. (M.) regalis*, *M. (M.) tica* nov. sp., and *M. (M.) veracruzana* sp. nov.

Taxonomic comments. This species is morphologically like *M. insignis*, the main differences are that the female has the scutellar tubercles strongly projecting upwards (Fig. 6A), and the pygidial plate covered by metallic scales and its apex is rounded (Fig. 4B); and the male has the apex of T7 noticeably forked, both apices rounded (Fig. 7B).

Mesoplia (Mesoplia) regalis (Smith, 1854)

Melissa regalis Smith, 1854: 280. Syntypes: British Museum Natural History, London, England (♀♂). Type locality: Brazil, Pará, Santarém.

Diagnosis. Male: body metallic green and pubescence white and brown; reddish brown on antennal integument, pronotal lobe, tegula and legs; scutum and tegula with metallic green scales; scutellar tubercles with a flattened surface, median slit between them; bifurcated middle tibial spur, with integument brown; anterior projection with 2 to 4 internal teeth; anterior edge of T1 with scattered white setae, lateral edges with a brown and white spot; T7 with the flat tips, with setae below it that are noticeable in dorsal view.

Female: body metallic green, with white pubescence; antennal integument, pronotal lobe, tegula and legs reddish brown; scutum and tegulas with scales metallic green;

scutellar tubercles more developed than in *M. sapphirina* with a deep depression between them and tubercles conspicuously pointed the delimiting carina is more developed only along the tubercles gradually fading to the sides; bifurcated middle tibial spur, integument brown; anterior projection with 2 to 4 internal teeth; pygidial plate with rounded apex and metallic scales that do not reach the apex (Melo & Rocha-Filho, 2011).

Taxonomic summary

Material examined. 1♂: Panama: Islas de las Perlas, Isla del Rey, 8°23'34.70" N, 78°54'24.11" W, 139 m, 13-IV-1981, R. W. Brooks, 1♂ (SEMC 1254921).

Distribution. Mainly South American, with the northern limit in Panama (Moure & Melo, 2023).

Taxonomic comments. According with Melo and Rocha-Filho (2011), this is a species similar morphologically to *M. sapphirina*, the main difference is that in this species the tubercles of the scutellum have the distal edge projecting upwards, more evident in females; the dorsal surface of the T7 in males bulging, with flat apices and with setae inserted underneath, distinguishable even in dorsal view. Specimens from Brazil deposited in SEMC were analyzed, whose distribution data were not included because they are from a distribution area not included in this study.

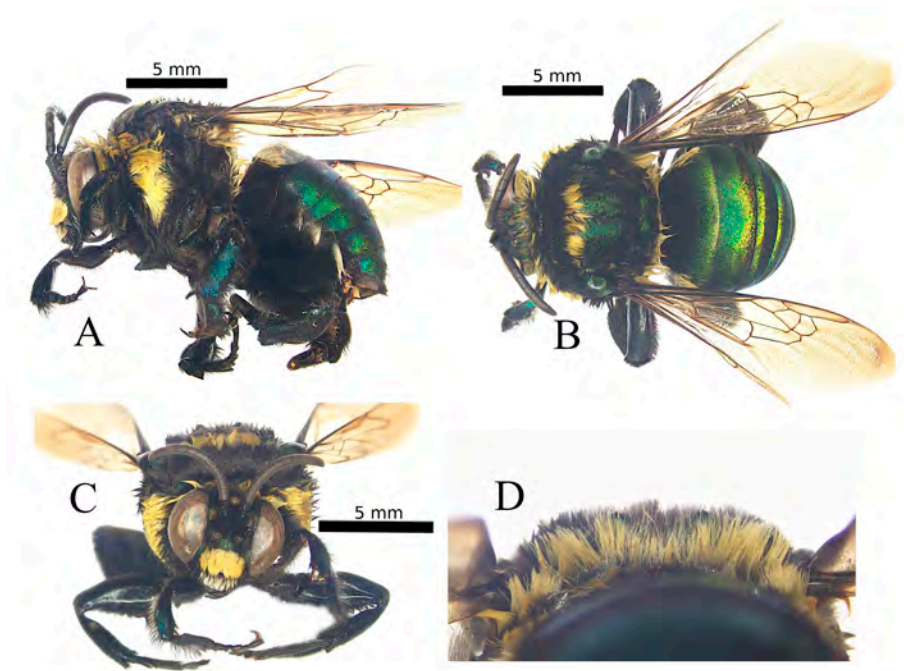


Figure 11. *Mesoplia (M.) tica* sp. nov. Holotype, male: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

Mesoplia (Mesoplia) sapphirina Melo & Rocha-Filho, 2011

(Figs. 1A, 2A, 3C, 4C, 7C, 14, 15, 16A, 17, 18A, 19)

Mesoplia sapphirina Melo & Rocha-Filho, 2011: 30. Holotype: Department of Zoology, Universidade Federal do Pará, Curitiba, Brazil (♀). Type locality: Panamá, 'Old Panama'.

Diagnosis. Male: body metallic blue, with whitish setae (Fig. 14); F1 light reddish brown; remainder of flagellum, pronotal lobe, tegula, most of legs and sterna dark reddish brown; scutum and tegula with metallic blue scales; scutellar tubercles poorly developed, posterior carina conspicuous; middle tibial spur forked, both apical branches with robust teeth, outer branch with 2 small internal teeth (Fig. 16A); dorsal surface of T7 bulging, its projected ventral portion conspicuously excavated; with a pair of apical projections of T7 with rounded apices, emargination between them relatively deep (Fig. 7C); dorsal and digitiform lobes of the gonostylus well developed (Fig. 15C, D).

Female: body metallic blue, with whitish setae (Fig. 17); F1 light reddish brown; remainder of flagellum, pronotal lobe, tegula, most of legs and sterna dark reddish brown; scutellar tubercles weakly developed, its surface only slightly convex and its tubercles low and broadly

rounded; the carina that delimits the tubercles posteriorly well developed and runs continuously from one side of the scutellum to the other; middle tibial spur forked, both apical branches with robust teeth, outer branch with 2 small internal teeth (Fig. 18A); pygidial plate with oval apex and covered with decumbent bluish metallic scaly hairs, except for the apex which is naked (Fig. 4C).

Variation. Some males have yellow setae on the posterior surface of the scutellar tubercles.

Taxonomic summary

Material examined. Costa Rica: Cartago: Cachí, 9°49'52.06" N, 83°48'18.12" W, 1,016 m, 28-V-1974, G. Rivera, 1♀ (MZUCR HY6608). Guanacaste: Bagaces: Barrio el Brasil, 10°32'57.36" N, 85°15'54.11" W, 114 m, 5-V-2022, K. Borbón, 1♀ (CINAT JZ340), 3♂ (CINAT JZ341 - CINAT JZ343). 10°32'58.60" N, 85°15'52.42" W, 110 m, 8-IV-2023, K. Borbón, 1♀ (MZUCR HY6131), 1♂ (MZUCR HY6131). Filadelfia, 10°26'51.27" N, 85°32'59.86" W, 22 m, 28-IX-1959, M. Leiva, 1♂ (MZUCR HY6816); La Cruz: Cuajiniquil, Bahía Tomás, Salinitas, in mangrove, 10°55'15.60" N, 85°42'57.96" W, 0 m, 28-I-2022, M. F. Otárola & J. Lobo, 1♀ (MZUCR HY2249), 7-II-2022/7-III-2022, M. M. Chavarría & P. Hanson, 2♀ (MZUCR HY5067), (MZUCR HY5068), 25-III-2021, M.

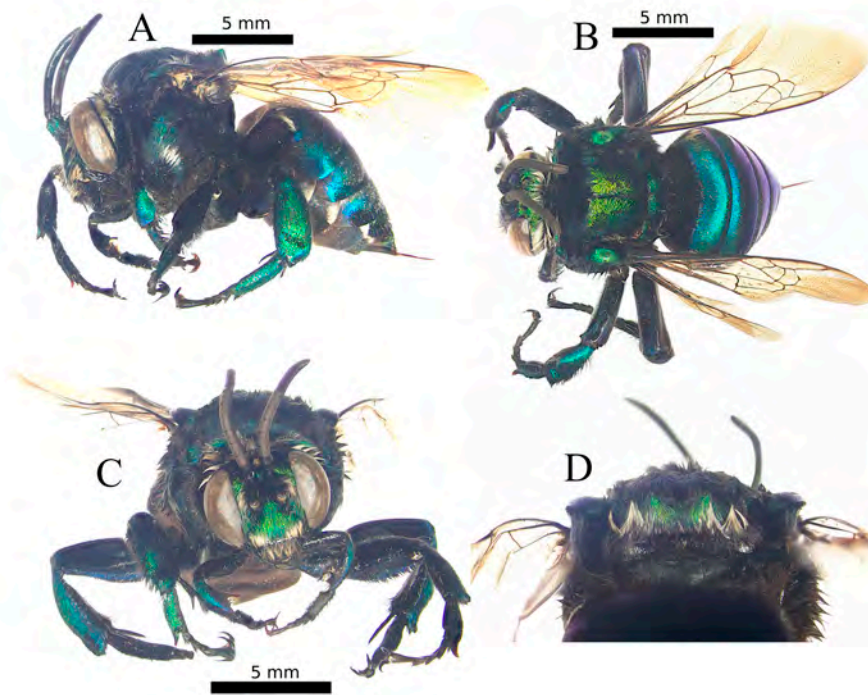


Figure 12. *Mesoplia (M.) tica* sp. nov. Holotype male: A, S7. B, S8. C and D, genital capsule, dorsal and lateral view, respectively.

F. Otárola & J. Lobo, 1♀ (MZUCR HY2345), V-2022, M. M. Chavarría & P. Hanson, 1♀ (MZUCR HY6838); Nicoya: Sámará, 9°52'51.60" N, 85°31'36.30" W, 17-I-2009, C. Reichie, 1♀ (MZUCR HY5051). San José: San Pedro de Montes de Oca, 9°56'11.41" N, 84°2'58.50" W, 1,201 m, 20-VI-1959, Y. Gómez, 1♀ (MZUCR HY5061). Mexico: Chiapas: La Concordia, 16°7'12.00" N, 92°39'0.00" W, 616 m, 1-IV-2016, P. Sagot, 1♀ (ECOAB 58710), 16°3'36.00" N, 92°33'36.00" W, 550 m, 5-III-2020, P. Sagot, 1♂ (ECOAB 134687); Mazatan, 14°55'12.00" N, 92°37'48.00" W, 6 m, 2-II-2019, P. Sagot, 1♂ (ECOAB 130647), 14°55'48.00" N, 92°37'12.00" W, 8 m, 2-II-2019, I. Pérez, 1♂ (ECOAB 130665); Tonalá, 15°30'0.00" N, 92°24'0.00" W, 3 m, 21-IV-2011, 1♀ (ECOAB 56616). Jalisco: La Huerta: Chamela, 19°29'54.77" N, 105°2'41.22" W, 10-IX-1981, S. Bullock, 1♀ (EBCH SB736), 19-X-1985, S. Bullock, 1♀ (SEMC 1451101), 27-IX-1985, R. Ayala, 1♀ (SEMC 1451080); Estación Biológica Chamela, 19°29'54.77" N, 105°2'41.22" W, 25-IX-1985, C. D.

Michener, 1♀ (EBCH JZ65); La Manzanilla, 19°17'0.03" N, 104°47'13.06" W, 1 m, 16-XI-1994, A. Moreno, 1♀ (HFL 302), 1♀ (CZUG 302), 16-XI-1994, H. E. Fierros-López, 1♀ (HFL JZ7), 1♂ (HFL JZ8), 1♀ (CZUG 309); Playa Careyitos, 19°29'36.18" N, 105°1'29.56" W, 27-X-1985, R. Ayala, 1♀ (EBCH RA219), 27-IX-1985, R. Ayala, 1♀ (EBCH RA218), 30-IX-1985, C. D. Michener, 1♀ (SEMC 1451078); Playa Careyitos 6 Km. South of Chamela, 19°29'36.18" N, 105°1'29.56" W, 27-IX-1985, A. Rodríguez P., 1♀ (EBCH JZ63), R. B. Roberts, 1♀ (EBCH JZ64); Playa Teopa, 19°23'48.69" N, 105°1'9.27" W, 4-X-1985, J. G. Rozen 1♀ (EBCH JZ62), R. Ayala, 1♀ (EBCH JZ69). Oaxaca: San Pedro Huamelula, 15°55'48.00" N, 95°46'48.00" W, 22 m, 21-XII-2019, P. Sagot, 1♂ (ECOAB 133378). Sinaloa: San Ignacio, Autopista 4 Río-Piaxtla, 23°55'59.28" N, 104°25'59.88" W, 1,184 m, 18-III-1990, W. Bell, D. Conlon & R. L. Mickley, 1♀ (SEMC 1451099). Tabasco: Tenosique, 17°18'0.00" N, 91°10'12.00" W, 126 m, 23-V-2018, A. Tapia, 1♀ (ECOAB 120153). Tamaulipas:

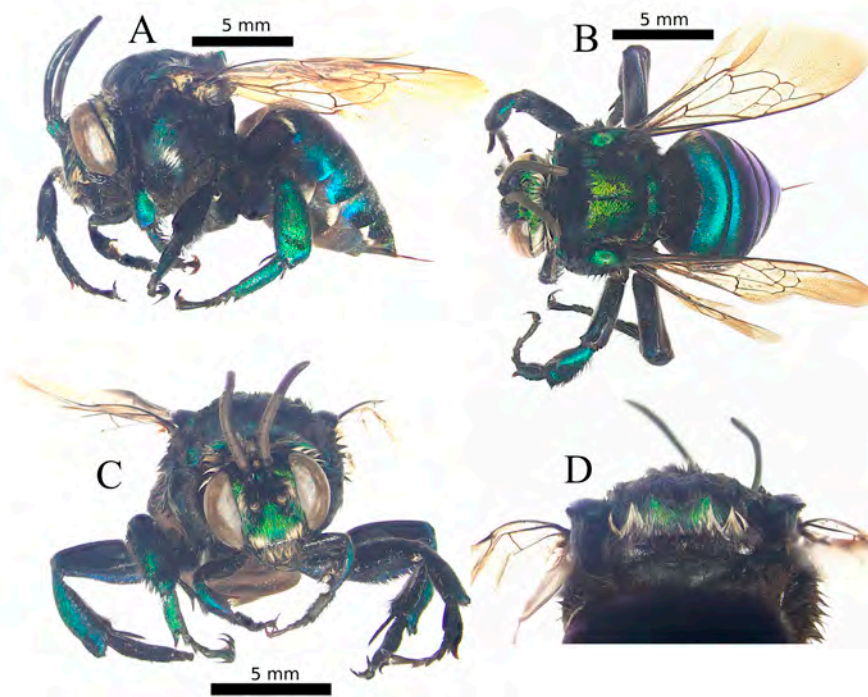


Figure 13. *Mesoplia (M.) tica* sp. nov. Allotype, female: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

Altamira, Playa Altamira, 22°29'59.53" N, 97°51'41.04" W, 3-VI-1985, M. S. Wasbauer & J. E. Slansky, 1♀ (SEMC 1442315); Llera de Canales, 23°19'24.79" N, 99°1'19.66" W, 267 m, 19-VII-1954, Univ. Of Kans. Mex. Exped., 1♂ (SEMC 1451076); Soto la Marina, La Pesca, 23°46'31.53" N, 97°44'21.63" W, 4 m, 1-VII-1981, B. Miller, B. Porter & L. Stage, 6♀ (SEMC 1451070 - SEMC1451075); Tampico, 22°13'57.47" N, 97°53'30.53" W, 2 m, 10-VI-1951, H.E. Evans, 6♀ (SEMC 1451089 - SEMC 1451094), 1♂ (SEMC 1451088). Veracruz: without coordinates, 25-VII- 1995, 1♀ (CERUADY 239ver). 25-VII-1995, 1♂ (CERUADY 230ver); Actopan: Cofre de Perote, 19°35'45.96" N, 96°22'47.28" W, 10 m, VI-2019, P. Luna & W. Dáttilo, 1♀ (IEXA JZ38); La Mancha, 19°21'12.60" N, 96°13'27.48" W, 3 m, VI-2022, B. Ratoni & W. Dáttilo, 1♂ (EBCH 622 1), 19°21'16.92" N, 96°13'29.64" W, 15 m, VI-2022, B. Ratoni & W. Dáttilo, 1♀ (EBCH 623 7), 1♂ (EBCH 623 6), V-2023, C. Pinilla, 2♂ (EBCH JZ355, EBCH JZ356). Boca del Río: 8 km SE of Boca del Río, 19°3'13.58" N, 96°2'42.53" W, 9 m, 22-VII-1990, W. Bell, D. Conlon & R. L. Mickley, 1♂ (SEMC 1451100); San Andrés Tuxtla: Estación biológica Los Tuxtlas, 18°31'0.00" N, 95°7'59.59" W, 136 m, 16-IX-2018, I. Huerta, 1♀ (CZUG JZ 13); Tecolutla: 20°28'47.00" N, 97°0'36.00" W, H. E. Evans, 1♀ (SEMC 1451095),

2.41402 km N of Tecolutla, 20°29'33.25" N, 97°1'34.21" W, 4.572 m, 12-VI-1985, Univ. of Kans. Mex. Exped., 1♂ (SEMC 1451077). Yucatán: Tizimín: El Cuyo, 21°31'5.99" N, 87°40'59.00" W, 25-VII-1995, H. Moo, 2♀ (CERUADY 009406(02450)), (009411(02477)), 1♂ (009414(02451)), R. Tut, 7♀ (CERUADY 009574(02453), (009546(02454)), (009543(02455)), (009539(02456)), (009541(02474)), (009545(02475)), (009536(02476)), 1♂ (009544(02461)), 14-VI-1995, R. Tut, 8♀ (CERUADY 007998(02452)), (007987(02462)), (007992(02457)), (007986(02465)), (007980(02466)), (007982(02467)), (008004(02469)), (008000(02473)), 5♂ (007996(02458)), (007979(02460)), (007994(02463)), (007983(02472)), (008006(02479)), 24-V-1995, R. Tut, 1♀ (006649(02468)), 1♂ (006651(02478)), H. Moo, 1♂ (006844(02464)), 4-IV-1995, R. Tut, 1♀ (005166(02470)), 1♂ (005175(02459)). Nicaragua: León: Campus Agropecuario UNAN-León, 12°25'22.14" N, 86°57'8.68" W, 16-V-2022, R. Varela, 1♀ (LEECAY JZ292). Panama: Chimán: Brujas: Punta Bruja, Zona del Canal, 8°35'6.51" N, 78°31'56.69" W, 4 m, 25-I-1929, C. H. Curran, 1♂ (SEMC 1451102). Panamá: Panamá Viejo, 9°0'22.09" N, 79°29'6.29" W, 5 m, 16-IV-1945, C. D. Michener, 1♂ (SEMC 1451079). Panamá Oeste: Fort Kobbe, 8°55'0.30" N, 79°34'59.59" W, 8 m, 11-I-1960, W.

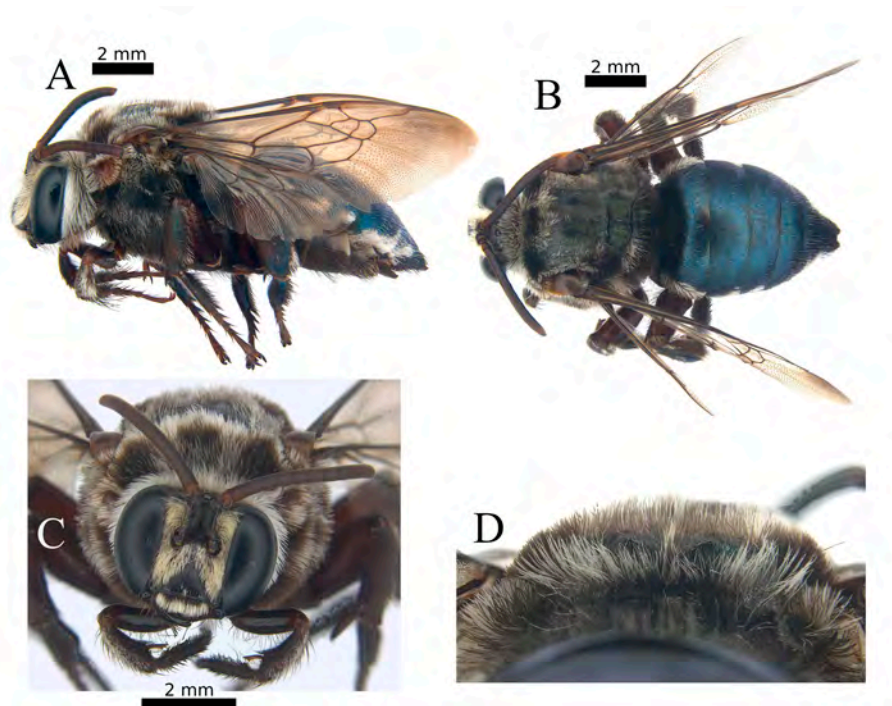


Figure 14. *Mesoplia (M.) sapphirina*, male: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

J. Hanson, 2♀ (SEMC 14510972), (SEMC 1451098), 2♂ (SEMC 1451096), (SEMC 1427034).

Distribution. The northernmost distribution has been recorded in Sonora, along the Pacific Ocean slope and in Tamaulipas on the Gulf of Mexico slope, to the south the limit of its distribution it is in the center of Panama (Fig. 19).

Taxonomic comments. It is a species morphologically similar to *M. regalis*, the main difference is that the apices of the scutellar tubercles are rather flattened (Fig. 16A, D), not projected upwards (this character can be confused if the scales in this area of the body have been lost), while males do not present setae that protrude in dorsal view below T7 and the apices of this are rounded (Fig. 7C).

Mesoplia (Mesoplia) veracruzana Zamarripa-Fernández & Ayala sp. nov.

(Figs. 4D, 10, 20, 35D)

<http://zoobank.org/urn:lsid:zoobank.org:act:BA688E1E-A2ED-435E-9FB3-C5276D2E0A84>

Diagnosis. Female: body metallic blue, with pubescence mostly blackish, but bright yellow setae on head and mesosoma, especially on the pronotum, mesepisternum, posterior region of the scutellum, metanotum and lateral

areas of the propodeum (Fig. 20); integument black in antenna, pronotal lobe, tegula and legs; posterior apex of scutellar tubercles projecting upwards (Fig. 20C); middle tibial spur forked, with black integument, the anterior projection with 3 inner teeth; tergal pubescence mainly dark with a bright yellow spot on both lateral margins of T1 and T2 (Fig. 20A); pygidial plate with rounded apex, but with a notch in the medial part of the apex, with scales that does not reach the apex, and with black integument (Fig. 4D).

Description. Holotype: female. Body length 17.9 mm, forewing length 12.6 mm, head length 5 mm, intertegular distance 4.2 mm, T2 length 2.5 mm. Head: mandible with an internal tooth. Labrum subtriangular, surface slightly concave, with a raised preapical margin. Ocelli aligned to the upper margin of the eyes, protruding above the head in lateral view. Mesosoma: scutum convex in lateral view. Scutellar tubercles not very evident due to the large amount of pubescence, a noticeable cleft between them. Metanotum and propodeum vertical. Spine of the middle tibia long pointed. Medial tibial spur robust and forked, anterior projection with 3 internal teeth. Medial basitarsus with smooth posterior margin and a flattened distal process that is slightly curved externally. Metasoma: broad

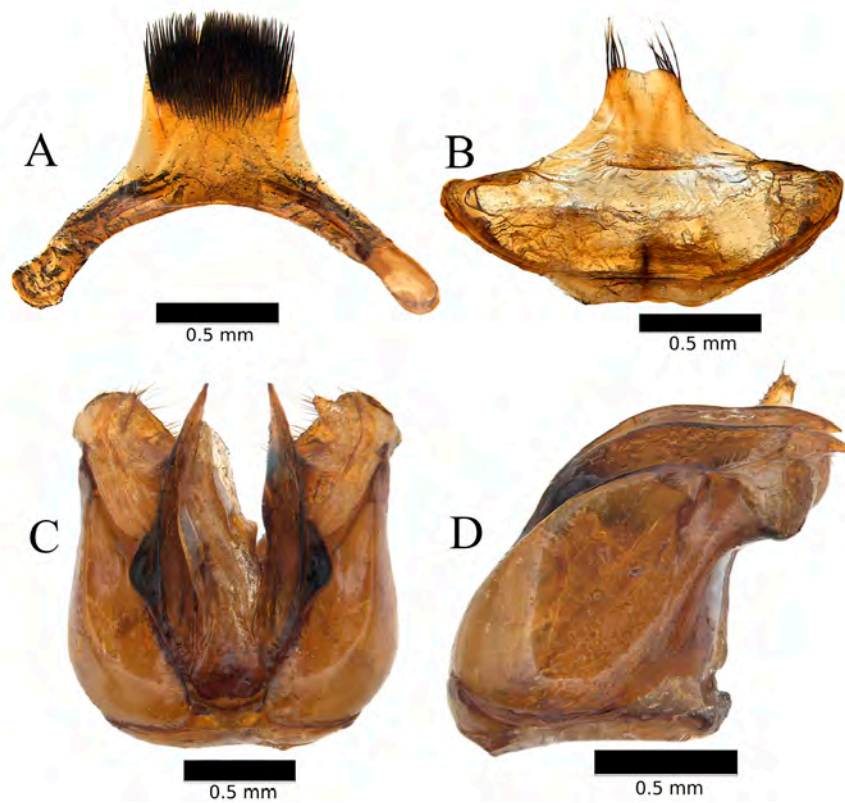


Figure 15. *Mesoplia (M.) sapphirina*, male: A, S7. B, S8. C and D, genital capsule, dorsal and lateral view, respectively.

pygidial plate at the base, apex subtruncate with a slight central notch. Color: integument blackish. Head: black on face, labrum and antenna; the flagellum with integument opaque. Apical third of mandible yellowish brown, except for black teeth. Mesosoma: almost all black. Apex of distal process of middle basitarsus reddish brown. Wings overall evenly smoked (Fig. 20A, B); forewings with the anterior edge of the marginal cell darker. Veins dark. Metasoma: between the terga and sterna reddish brown. Surface sculpture: head. Labrum with most surface rugose, basal edge polished. Mesosoma: punctured tegula. Reticulated propodeum. Metasoma: dotted pigdial plate. Pubescence: mostly bright yellow and black. Head: labrum discal area with white plumose setae and scattered simple black setae, lower edge with a pair of long dark tufts, lateral edges with simple black setae, upper edge bare. Clypeus with lower margin with white plumose setae, sides with pale yellow plumose setae, central surface with light metallic blue scales. Supraclypeal area with few long and scattered black simple setae and with scales equal to those of the clypeus. Frons with black setae and light metallic green

scales near the lower edge of the ocelli. Paraocular area with pale yellow plumose setae. Vertex and preoccipital region with bright yellow compound setae. Gena with setae bright yellow, except for the lower region that has black. Mesosoma: pronotal lobe with the anterior and external lateral margin with bright yellow setae, posterior margin with interspersed white and black setae, inner margin with mainly black setae, surface with dark metallic blue scales (Fig. 20). Mesepisternum upper region with bright yellow setae, lower region black. Scutum covered mainly by black setae, except for the lateral edges near the posterior two-thirds of the tegula that have interspersed bright yellow setae, central disc with light metallic green scales. Tegula black on the anterior and inner edge and with dark metallic blue scales on the surface. Upper of scutellum with few black setae and light metallic blue scales and bright yellow on posterior region, that projects a little between the tubercles. On the metanotum bright yellow. Propodeum upper region naked, posterolateral region bright yellow. Legs are mainly dark and with dark metallic blue scales on the external surfaces, with a tuft

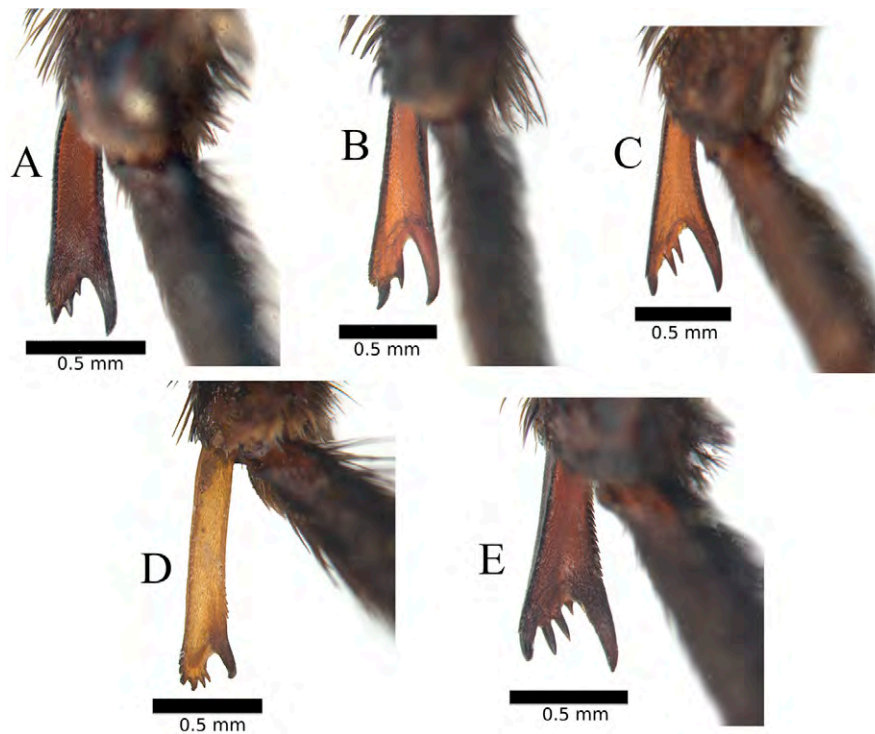


Figure 16. Middle tibial spur, male: A, *Mesoplia (M.) sapphirina*. B, *Mesoplia (M.) dugesi*. C, *Mesoplia (M.) rufipes*. D, *Mesoplia (E.) carmelitae* sp. nov. E, *Mesoplia (E.) ornata*.

of white setae on the posterior margin of the femurs of the forelegs and on the external apices of the middle femurs. Metasoma: terga covered with metallic bluish-green scales. Anterior edge of T1 with scattered white setae, lateral edges with a bright yellow spot; T2 with a smaller pale-yellow spot in the lateral marginal area. T4 and T5 with few white simple setae in lateral view. T6 with thick black setae on the sides of the pygidial plate. Pygidial plate with light metallic green scales that do not reach the apex. Sterna with scattered black setae. S2 to S4 with a sub triangular white spot on the lateral margins.

Male: unknown.

Taxonomic summary

Type material. Holotype: ♀ IEXA JZ39 MEX. VER [Mexico, Veracruz], Coatepec, 19°26'42.36" N, 96°57'52.13" W, 1,200 m, 6-VI-2020, G. Quintos-Andrade (IEXA). Paratypes: 3♀: UNAM-LT JZ352 MEX. VER [Mexico, Veracruz], San Andrés Tuxtla, Estación Biológica Los Tuxtlas, 18°35'5.50" N, 95°4'26.58" W, 160 m, 1985-VII-6, A. Ibarra (UNAM-LT). Same location as the previous one, 2♀ UNAM-LT JZ353, 1985-VI-2, P. Sinica. UNAM-LT JZ354, 1986-VII-20, P. Sinica.

Etymology. The name *veracruzana* refers to the known distribution of this species, the state of Veracruz, Mexico.

Distribution. Only known for the localities of Coatepec and San Andrés Tuxtla (Fig. 10), although there are photographic records in iNaturalist near Xalapa and Orizaba, localities with cloud forest and tropical forest.

Taxonomic comments. The female of this species has a pubescent color similar to that in the male of *M. insignis*, so they could be confused. In this species, the bright yellow pubescence on the metasoma is only located in the pronotum, mesepisternum, posterior region of the scutellum, metanotum and lateral areas of the propodeum (Fig. 20), unlike *M. insignis* whose metasoma is almost completely covered by yellow setae (Fig. 6).

M. azurea group (*sensu* Moure, 1960a, 1960b)

Diagnosis. Male: hind tibia with an inconspicuous setal brush and with 1 spur; ventral basal surface of posterior femur with a robust posterior projection (Fig. 3D, E); inner surface of basitarsus with a longitudinal carina. Female: with carina extending laterally from the pronotal collar, to the pronotal lobe (Fig. 5B).

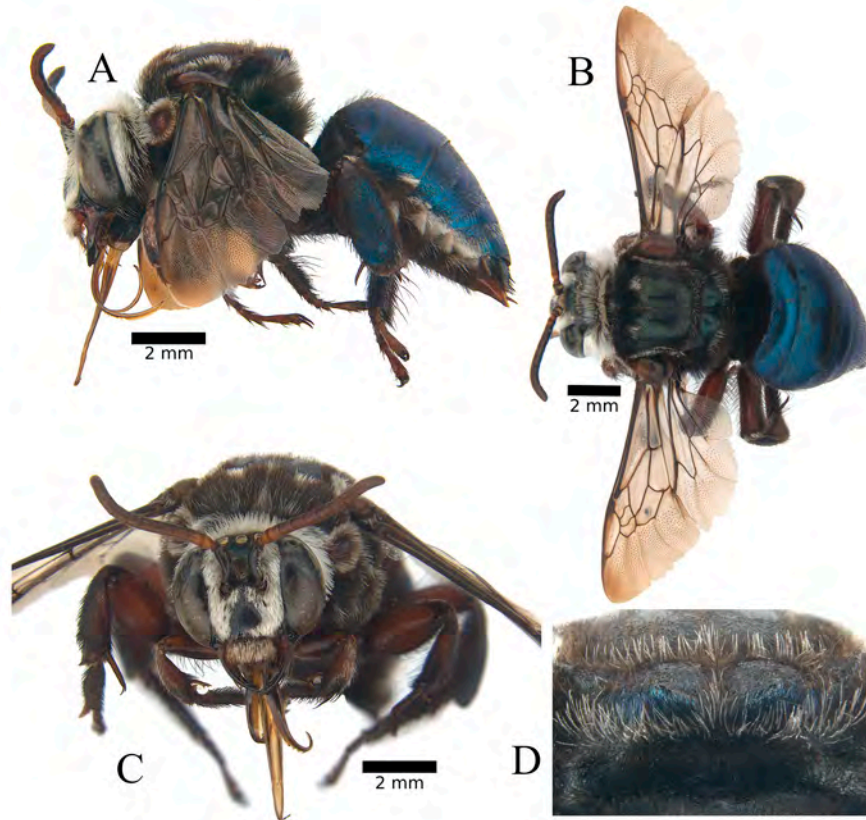


Figure 17. *Mesoplia* (*M.*) *sapphirina*, female: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of scutellar tubercles.

Mesoplia (*Mesoplia*) *dugesi* (Cockerell, 1917)
 (Figs. 1B, 3D, 4E, 5B, 7D, 10, 16B, 21-23, 35E)
Mesonychium dugesi Cockerell, 1917: 477. Holotype:
 National Museum of Natural History, Smithsonian
 Institution, Washington DC, United States of America
 (♂). Type locality: Mexico, Guanajuato.

Diagnosis. Male: body dark metallic blue, pubescence mainly black (Fig. 21), except for some white spots on the central surface of the labrum, anterior edge of the superior gena and clypeus; integument blackish on antenna, pronotal lobe, tegula and legs, except for the F1 which is usually dark reddish brown; tegula with metallic blue scales; wing with black veins; scutellar tubercles practically flattened and without a cleft between them; middle tibial spur forked with dark reddish-brown integument, anterior projection with 3 internal teeth (Fig. 16B); femur posterior with a robust posterior projection on the ventral basal surface (Fig. 3D); apex of T7 bifurcated, both with an acute angle and close to each other (Fig. 7D); dorsal lobe of gonostylus reduced (Fig. 22C, D).

Female: body dark metallic blue, with dark pubescence at first glance (Fig. 23), in a deeper examination some areas with whitish pubescence can be seen on labrum, superior area of the gena, internal margin of the pronotal lobe and a small spot on the posterior surface of the scutellum and between the tubercles; integument of antenna, pronotal lobe, tegula and legs blackish (dark reddish); labrum, vertex, preoccipital area and tegula with metallic blue scales; with a carina extending laterally from the pronotal collar to the pronotal lobe (Fig. 5B); wings with black veins (Fig. 23A, B); scutellar tubercles conical, slightly projecting with a shallow cleft between them (Fig. 23D); middle tibial spur forked with dark reddish-brown integument, anterior projection with 3 internal teeth; T1 with black setae; terga with metallic blue scales; pygidial plate with a narrow apex and completely covered by metallic bluish-green scales (Fig. 4E).

Description. Female: body length, 16.4 mm, forewing length 12.7 mm, head length 4.1 mm, intertegular distance 3.9 mm, T2 length 1.7 mm. Head: mandible with an

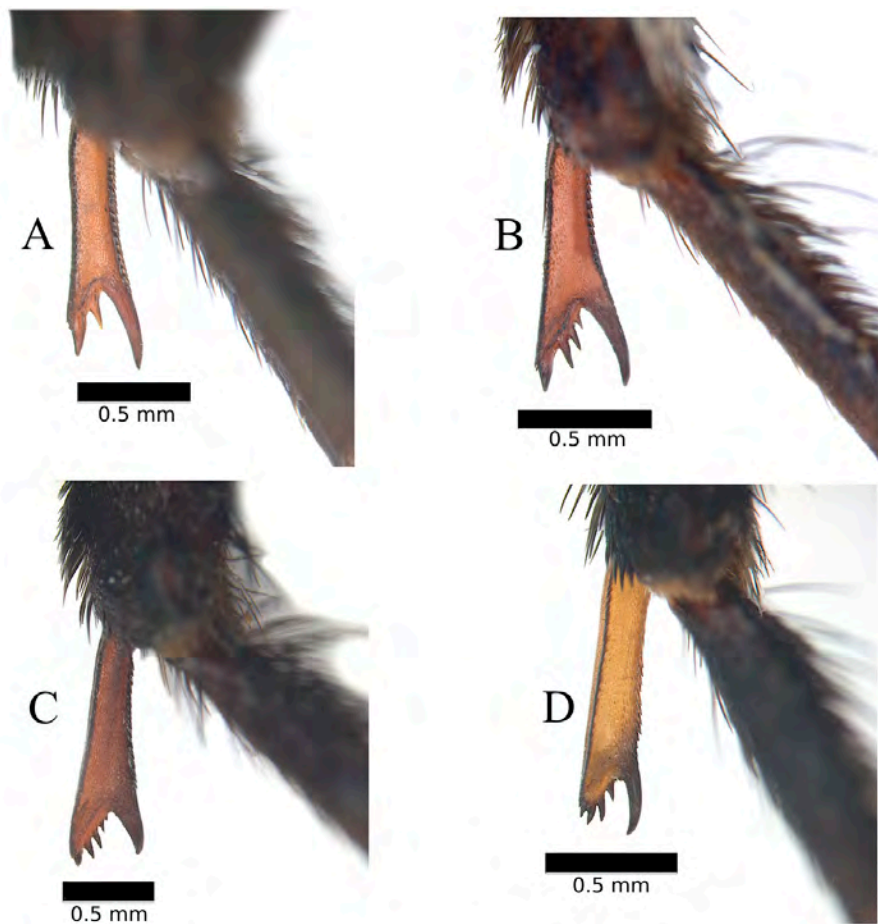


Figure 18. Middle tibial spur, female: A, *Mesoplia (M.) sapphirina*. B, *Mesoplia (M.) rufipes*. C, *Mesoplia (M.) oaxacana* sp. nov. D, *Mesoplia (E.) carmelitae* sp. nov.

internal tooth. Labrum subrectangular, surface slightly concave, with a raised preapical margin. Ocelli aligned with the upper margin of the eyes, protruding slightly above the head in lateral view. Mesosoma: with carina that runs laterally from the collar of the pronotum to the pronotal lobe. Convex scutum in lateral view. Scutellar tubercles rounded, without posterior carina, with a median slit between them. Metanotum and propodeum vertical. Medial tibial spine short rounded. Medial tibial spur bifurcated, anterior projection with 3 internal teeth. Medial basitarsus with pentadentate external margin and with a flattened distal process that is slightly curved externally. Metasoma: broad pygidial plate at the base, narrow rounded apex. Color: integument blackish to dark reddish brown. Head: labrum with reddish brown lateral and anterior edges, blackish surface. Apical region of mandible blackish (yellowish brown) reddish brown

in basal region. Scape and pedicel blackish to reddish brown. F1 reddish brown, remainder of flagellum brown. Mesosoma: pronotal lobe and tegula dark reddish brown. Almost transparent wings. Forewings with the anterior edge and the distal apex of the marginal cell darker, also presenting a darker spot that goes from the external edge of the 2r-m to the wing apex (Fig. 23B). Dark veins. Inner surfaces of legs dark reddish brown, outer surfaces blackish. Apex of the distal process of the medial basitarsus ferruginous and medial tibial spur reddish brown. Metasoma: blackish sterna, except for S6 which is reddish brown. Surface sculpture: head. Labrum with most surface rugose, basal edge polished. Mesosoma: punctured tegula. Strigulate propodeum. Metasoma: dotted pigdial plate. Pubescence: mostly blackish. Head: labrum central surface with white feathery setae and scattered simple black setae, lower edge with a pair of

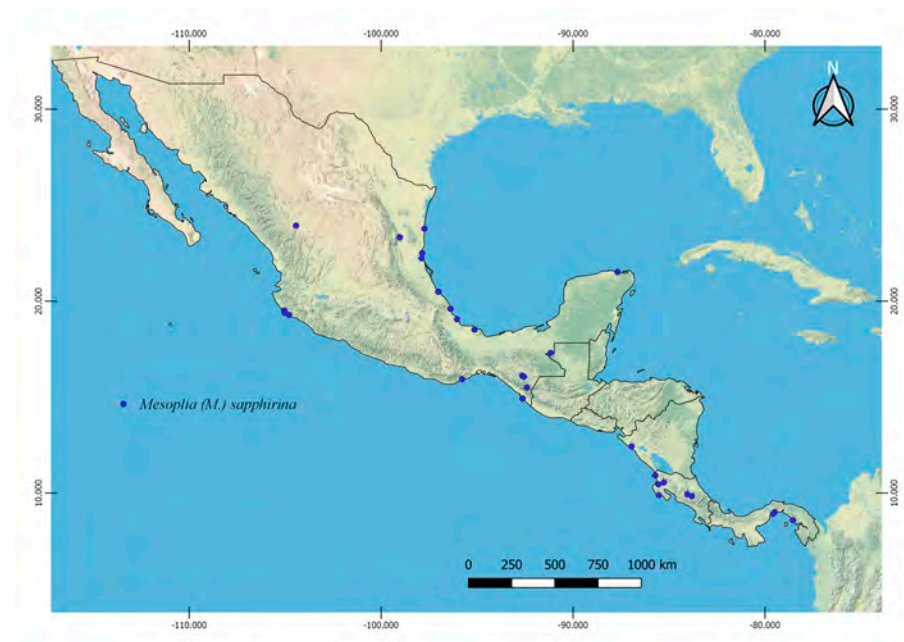


Figure 19. Map with the known distribution of *Mesoplia (M.) sapphirina*.

long dark tufts, lateral edges with simple black setae, upper edge bare. Clypeus and supraclypeal area with metallic blue scales and long black simple setae. Scape with short black setae. Frons with black setae and metallic blue scales on the lower edge of the ocelli. Paraocular area mainly with simple black setae, with a tuft of setae near the antennal alveolus. Vertex and preoccipital region with simple black setae and metallic blue scales. Gena with black setae, except for the middle region near the eyes which has white setae. Mesosoma: with black setae except for the inner margin of the pronotal lobe and a small spot on the posterior surface of the scutellum and between the tubercles. Pronotal lobe with metallic blue scales. Anterior region of the scutum with dense setae coverage. Central disc with scattered setae and light metallic blue scales. Tegula with black setae on the anterior edge and metallic blue scales on the inner edge. Scutellum upper region with few black setae and metallic blue scales, posterior region also with metallic blue scales. Naked propodeal triangle. Legs are mainly black, with only a patch of white setae on the external apex of the anterior tibia and on the external apex of the middle femur. External surface of the tibiae of all legs with metallic blue scales and on the posterior basitarsus. Metasoma: with black setae except for the lateral margins of S2 to S4 which have a triangular spot of short white setae. Sterna with scattered black setae.

Variation. Some males have a greater proportion of white setae in some body regions, on all margins of the pronotal lobe, in the anterior region of the scutum, anterior and posterior apex of the tegula, between the tubercles and in the posterior region of the scutellum, metanotum and on the supralateral margins of the propodeum.

Taxonomic summary

Material exanimated. Mexico: Jalisco: Mazamitla, Puerta del Zapatero, 19°50'29.00" N, 103°5'52.00" W, 1,615 m, 27-VIII-2005, H. E. Fierros-López, 1♂ (HFL); Teocuitatlán: Laguna de Sayula, 19°56'55.00" N, 103°27'56.00" W, 1,350 m, 28-VIII-2011, A. Aguilar, 1♂ (HFL 1111); Zapopan: Barranca la Experiencia, 20°44'6.13" N, 103°19'38.38" W, 1,200 m, 23-VIII-1997, G. Mercado, 1♀ (HFL 1107), 23-VIII-1996, G. Mercado, 1♂ (HFL), 14-IX-1996, G. Mercado, 1♂ (CZUG 1108), 1,350 m, 27-IX-2009, G. Mercado, 1♀ (CZUG). Michoacán: Nahuatzen: Zacapu, 19°45'22.46" N, 101°46'52.61" W, 2,152 m, 10-IX-2014, G. Mérida, 1♂ (ECOAB 25661).

Distribution. Only known from Jalisco, Guanajuato and Michoacán in México, although there is at least one record in iNaturalist for Querétaro (Fig. 35E). Its distribution seems to be restricted to the center of the country (Fig. 10).

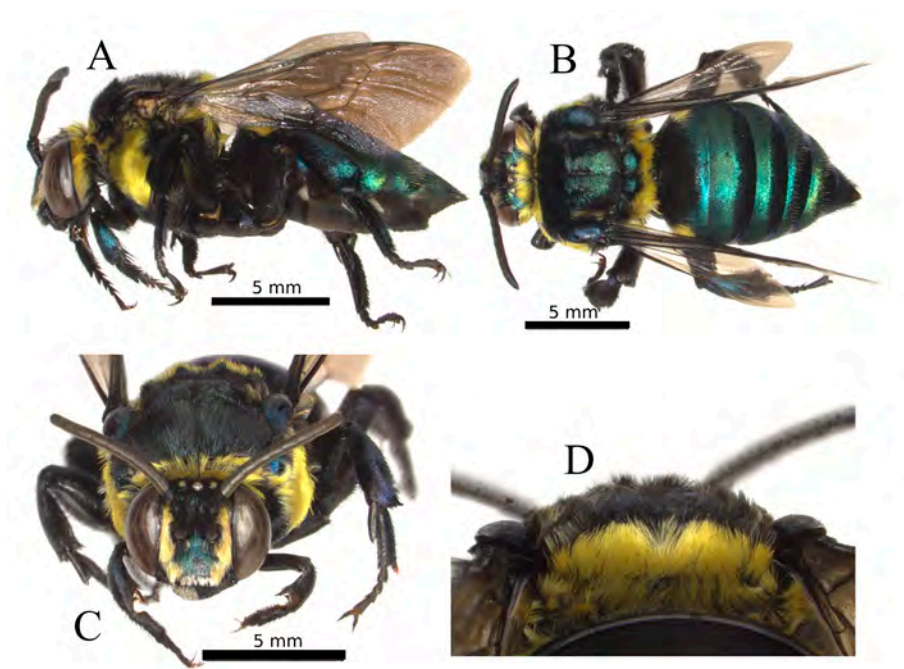


Figure 20. *Mesoplia (M.) veracruzana* sp. nov. Holotype, female: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

Taxonomic comments. Is the darkest species distributed in the region, both the general pubescence of the body and the integument of the legs are mainly blackish.

Mesoplia (Mesoplia) rufipes (Perty, 1833)
 (Figs. 1C, 3E, 2B, 4F, 7E, 16C, 18B, 24-27, 35F)

Crocisa rufipes Perty, 1833: 149. Holotype: Zoologische Staatssammlung München, Munich, Germany (♂). Type locality: Brazil, Piauí.

Melissa charruana Holmberg, 1884: 205. Holotype: Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina (♂). Type locality: Uruguay, Colonia.

Mesoplia spinipes Hiller & Wittmann, 1994: 112. nom. nud.

Mesoplia guatemalensis Cockerell, 1912: 567. Holotype: National Museum of Natural History, Smithsonian Institution, Washington D.C., United States of America (♀). Type locality: Guatemala, Gualan. New junior synonym.

Diagnosis. Male: body metallic blue-greenish coloration and with whitish pubescence (Fig. 24); integument of the scape, pedicel and f1 ferruginous (in some specimens inner margin of the scape darker); integument ferruginous on apical flagellomere in posterior view, pronotal lobe and tegula; integument of legs dark brown, on external surface and ferruginous on internal;

tegula without scales (Fig. 24B); wing veins ferruginous; with rounded scutellar tubercles, with posterior carina and no cleft between them; femur posterior with a robust posterior projection on the ventral basal surface (Fig. 3E, 35F); terga with blue-green scales; apex of T7 bifurcated, both with an acute angle and close to each other (Fig. 7E); dorsal lobe of gonostylus reduced (Fig. 25C, D).

Female: body metallic blue-greenish coloration and with whitish pubescence (Fig. 26); integument ferruginous on scape, pedicel and f1, pronotal lobe, tegula and legs (some populations with dark brown integument); with a carina extending laterally from the pronotal collar to the pronotal lobe; tegula without metallic scales (Fig. 26B); wing veins ferruginous; conical tubercles slightly projected with a shallow cleft between them; terga with dorsal pubescence whitish; middle tibial spur bifurcated with ferruginous integument, anterior projection with 2 or 3 internal teeth (Fig. 18B); pubescence of the anterior edge of T1 whitish; terga with green scales; pygidial plate with a narrow apex and covered by metallic bluish-green scales (Fig. 4F).

Notes made by Moure (1960a) from the holotype: "The pubescence of the clypeus and paraocular area, especially in the upper part, tends to very pale yellow. With few dark hairs in the supraclipeal area, next to the ocelli and on the frons. The pubescence of the thorax is pale on the

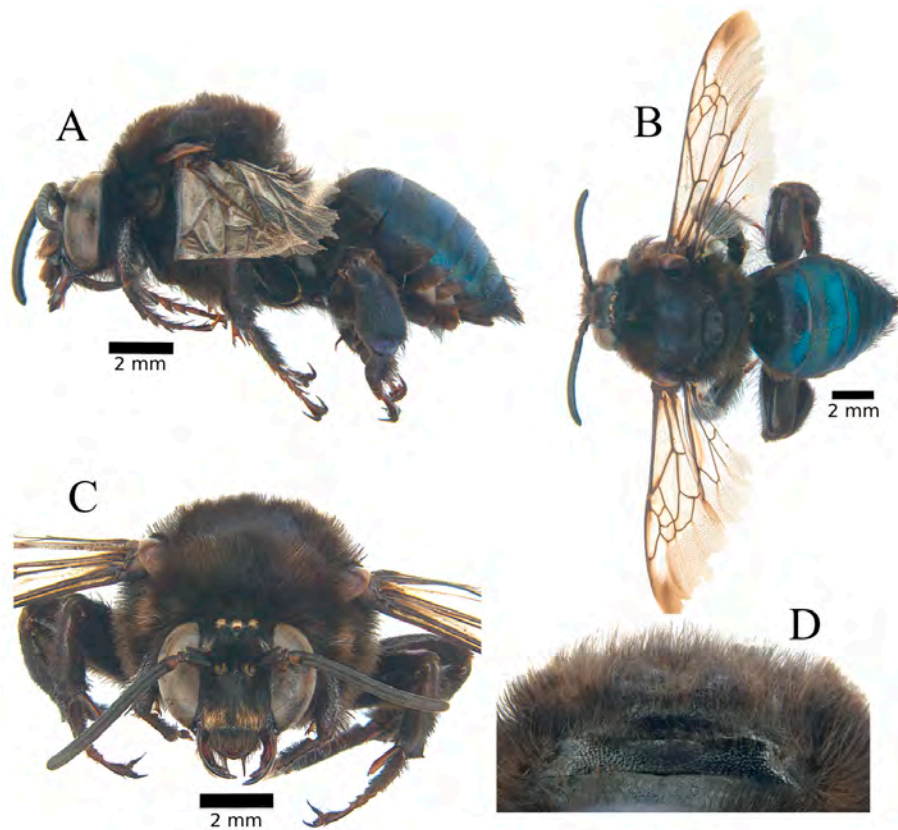


Figure 21. *Mesoplia (M.) dugesi*, male: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of scutellar tubercles.

pronotum, with dark setae on the lobes. Dark setae in the anterior third of the mesoscutum, but divided in the middle by a line of white setae and bordered posteriorly by white setae. Mesoscutum disc with fine bronze-green scales and few setae; The punctuation is very evident there in two sizes, the small denser dots and the thick ones very dispersed. On the mesepisternum there is white pubescence above and below an irregular disc area of dark setae and ventrally the setae are also dark. The terga are covered with bronze-green scales and in certain light give the impression of being dark at the base of each tergum, each side of the terga with a small longitudinal line of white setae on the border with the ventral surface which is covered with setae quite short white ones. The long setae of T1 to T5 are white, in the last two black. The integument of mandibles, labrum and legs is rusty; the tegulae and pronotal lobes of a lighter rust color.

The spur of the middle tibia widened towards the apex and bifurcated, with the inner ramus having a single tooth and the outer ramus having a toothed inner edge. The middle basitarsus with the posterior angle between the

external and internal surfaces only edged, not laminated. Hind femurs thickened near base projecting backwards at a large finger-like angle. The tibia moderately thickened at the apex, internally more or less flattened, distally on the internal surface a short imperfect tuft and with a relatively short spur. The posterior basitarsus with the inner side flattened and smooth, largely glabrous and separated from the posterior surface by a thin carina. T7 with the apex narrowly emarginated in a paraboloid shape, the tips relatively close together and strongly rounded. The S4 widely emarginated, procurved, with a wide short band ending at the level of the edge. S5 with deeper emargination, very pubescent, hairs curved towards the center. Approximate length 13.2 mm, forewings including tegula 13 mm; head width 4.28 mm, abdomen 5.45 mm."

Variation. The shape of the S8 seems to be highly variable; and the shape of the basal projection of the posterior femur on males, in some individuals it is wider, while in others it is narrower.

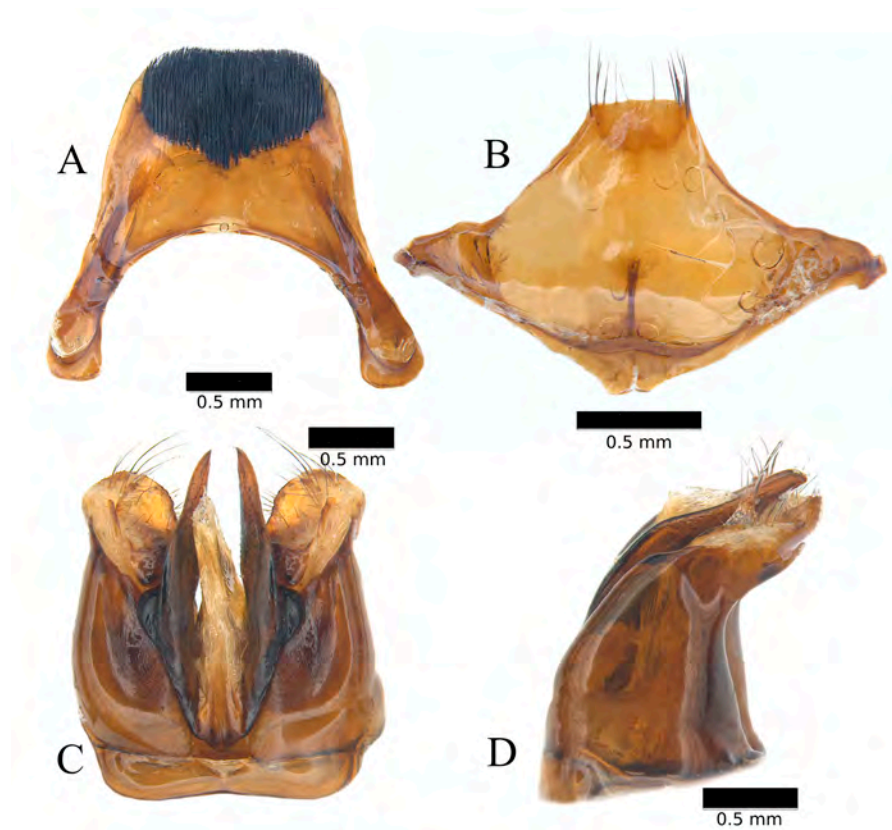


Figure 22. *Mesoplia (M.) dugesi*, male: A, S7. B, S8. C and D, genital capsule, dorsal and lateral view, respectively.

Taxonomic summary

Material examined. Costa Rica: no location data, 1♂ (MZUCR HY6836). Guanacaste: Bagaces, 8 km al NE de Bagaces, Pan Am Hwy, 10°32'17.67" N, 85°19'53.58" W, 116 m, 23-II-2000, P. Ronchi & G. W. Frankie, 1♂ (MZUCR HY5770), 24-II-2000, P. Ronchi & G. W. Frankie, 2♂ (MZUCR HY3446), (MZUCR HY3448), 12-II-2000, P. Ronchi & G. W. Frankie, 2♂ (MZUCR HY3450), (MZUCR HY3447), 9-III-2000, P. Ronchi & G. W. Frankie, 1♂ (MZUCR HY6835); Urban Bagaces, 10°31'39.84" N, 85°15'25.26" W, 83 m, 12-III-2004, L. Sandoval & G. W. Frankie, 2♂ (MZUCR HY6825), (MZUCR HY6824); Hacienda Monteverde 9 km NW Bagaces, 10°33'17.91" N, 85°16'12.50" W, 91 m, 24-II-1996, G. W. Frankie, 1♀ (MZUCR HY5697), 18-III-2022, J. Lobo, 1♀ (MZUCR HY6828); Carrillo: Filadelfia, 11.2654 SW of Filadelfia, 10°22'21.18" N, 85°37'29.14" W, 85 m, 3-III-1954, A. Wille & H. Daly, 1♀ (SEMC 1451159); Hojancha: Lajas, 9°59'34.55" N, 85°27'5.06" W, 200 m, 18-V-2014, S. Galbraith, 2♀ (INB0004444317 - INB0004444319); La Cruz, Cuajiniquil, Bahía Tomás,

Salinitas, in mangrove, 10°55'17.40" N, 85°42'57.96" W, 0 m, 25-III-2021, M. F. Otárola & J. Lobo, 1♀ (MZUCR HY2792), 7-II-2022/7-III-2022, M. F. Otárola & J. Lobo, 1♀ (MZUCR HY5064), 25-III-2021, M. F. Otárola & J. Lobo, 2♀ (MZUCR HY2348), (MZUCR HY2349), 18-III-2022/-IV-2022, M. M. Chavarría & P. Hanson, 1♀ (MZUCR HY5065), 9-IV-2022/7-V-2022, M. M. Chavarría & P. Hanson, 3♀ (MZUCR HY5063), (MZUCR HY5066), (MZUCR HY5066); Liberia, 10°38'55.46" N, 85°26'39.36" W, 149 m, 21-II-2013, 1♀ (MZUCR HY3449); Barrio La Arena, 10°36'21.96" N, 85°25'30.23" W, 142 m, 15-V-1980, E. Ponce, 1♂ (MZUCR HY6817); Pan Am Hwy, 10°38'32.38" N, 85°27'13.36" W, 132 m, 22-II-2004, G. W. Frankie & S. B. Vinson, 1♂ (MZUCR HY5696); Santa Cruz, Playa Junquillal, 10°10'7.04" N, 85°48'47.87" W, 3 m, 3-III-1976, R. M. Bohart, 1♀ (SEMC 1442317). Heredia: CINAT Lagunilla, 9°58'23.58" N, 84°7'45.55" W, 1,038 m, 30-VII-1997, A. Ortiz, 1♂ (CINAT JZ337), 27-III-2017, R. Díaz, 1♀ (CINAT JZ339); Sarapiquí: Puerto Viejo, Estación Biológica La Selva (OET), 10°25'49.70" N, 84°0'24.96" W, 50 m, 17-VII-1995, P. Hanson, 1♀

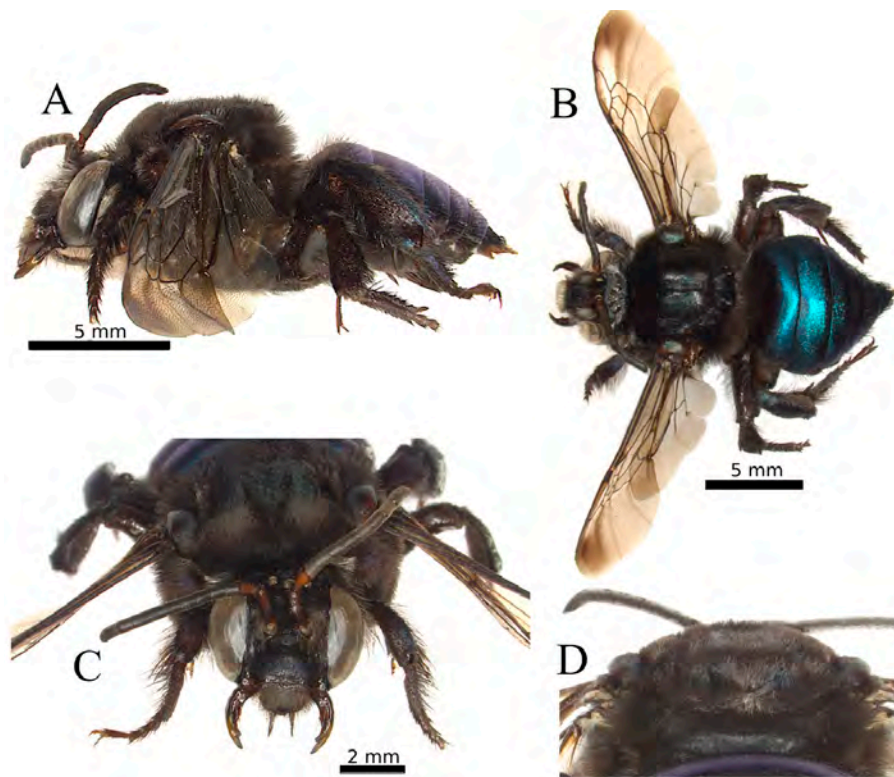


Figure 23. *Mesoplia (M.) dugesi*, female: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

(MZUCR HY6826), 2-IV-1993, P. Hanson & C. Godoy, 1♀ (MZUCR HY6818). Puntarenas: Golfo Dulce, 8°42'13.42" N, 83°29'8.86" W, 10 m, XII-1989/III-1990, P. Hanson, 1♀ (MZUCR HY6821); Gromaco, 34 km S of Potrero Grande en río, 8°50'49.49" N, 83°2'41.43" W, 836 m, 21-VII-1963, C. D. Michener & W. Kerfoot, 1♀ (SEMC 1451161); Rincon, 5 km S of Rincon, 8°40'57.72" N, 83°28'24.94" W, 21 m, 15-III-1973, E. Borrows, 1♂ (SEMC 1451162). San José, 9°40'0.01" N, 84°0'0.00" W, C. D. Michener, 1♀ (SEMC 1451160); Pérez Zeledón, Esperanza, 9°16'30.64" N, 83°42'9.86" W, 807 m, II-1997, N. Siles, 1♂ (CINAT JZ336), 13-IX-1999, A. Ortiz, 1♂ (CINAT JZ338); San Antonio de Escazú, 9°53'23.88" N, 84°8'17.66" W, 1,454 m, W. Edward, 1♂ (MZUCR HY6834). Guatemala: without locality, 28-III-1923, 1♀ (SEMC 1451087). Huehuetenango: La Libertad, 15°34'12.00" N, 91°51'0.00" W, 915 m, 27-IV-2010, M. Hurtado, 1♂ (ECOAB 25637), 28-IV-2010, C. Balboa, 2♂ (ECOAB 25639), (ECOAB 38876), L. Aguilar, 1♂ (ECOAB 25642), 26-II-2010, C. Balboa 2♂ (ECOAB 25643), (ECOAB 25646); San Antonio Huista, 15°36'36.00" N, 91°44'24.00" W, 1,192 m, 23-II-2010, D. Sánchez, 1♂

(ECOAB 25645). Honduras: Ocotepeque: Lucerna, Autopista 4, 9 km N of Lucerna, 14°37'36.00" N, 89°3'42.00" W, 792.48 m, 26-V-2003, D. Brzoska, 1♀ (SMO 418386). Mexico: No location data, J. Mérida, 1♀ (ECOAB 25656). Campeche: Champotón, 18°33'0.00" N, 89°56'24.00" W, 155 m, 8-VI-2018, J. Mérida, 3♀ (ECOAB 121736 - ECOAB 121738), 18°27'0.00" N, 89°53'24.00" W, 168 m, 6-VI-2018, 7♀ (ECOAB 121803 - ECOAB 121806), (ECOAB 121813 - ECOAB 121816). Chiapas: Acacoyagua, 15°24'0.00" N, 92°39'0.00" W, 862 m, 15-V-2007, R. Ayala, 1♂ (ECOAB 56633); Arriaga: 16°19'12.00" N, 93°58'48.00" W, 367.5 m, 10-III-2009, M. Guzmán, 1♂ (ECOAB 25641), 19-V-2009, C. Balboa, 1♀ (ECOAB 25657); Ej. López Mateos, 16°20'46.60" N, 93°58'26.80" W, 255 m, 13-III-2009, C. Balboa, M. Guzmán y M. Cigarroa, 2♂ (EBCH ECO-TAB57347), (EBCH ECO-TAB57276); Cacahoatán, 5 km. sur de Cacahoatán, 14°57'0.00" N, 92°9'0.00" W, 340 m, 18-IV-1993, A. Rodríguez P., 2♀ (EBCH JZ70), (SMO 317151), 2♂ (EBCH JZ77), (SMO 317154); La Concordia, 15°45'0.00" N, 92°58'12.00" W, 921 m, 23-IV-2021, P. Sagot, 1♂ (ECOAB 125000), J. Mérida, 2♂ (ECOAB 125229), (ECOAB

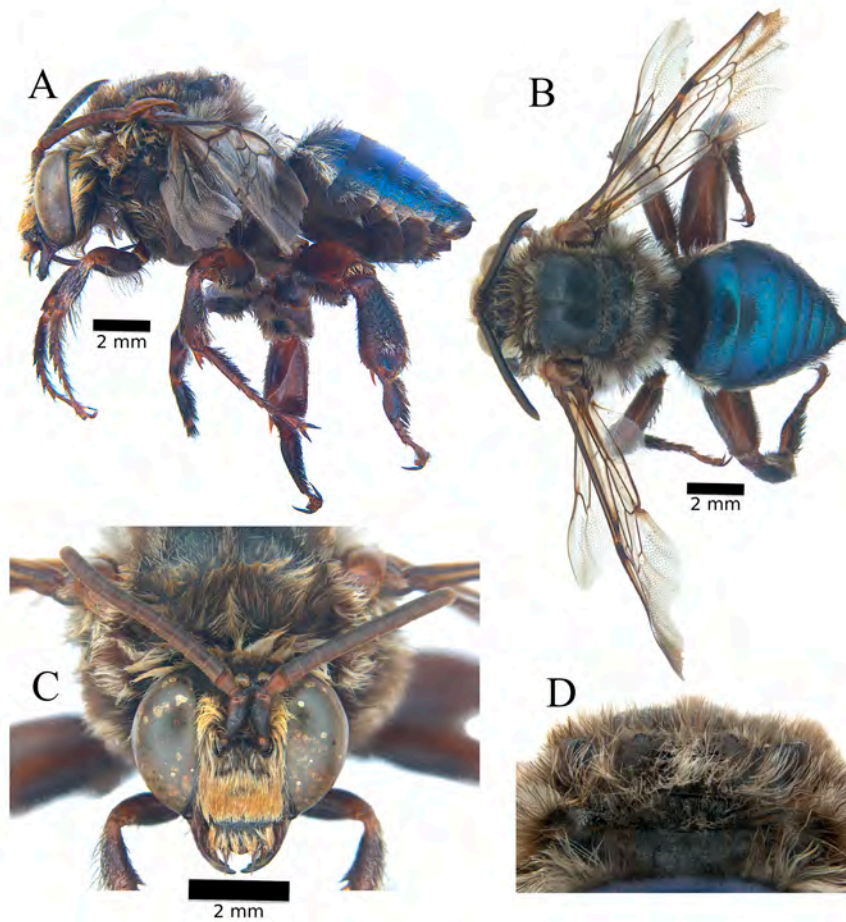


Figure 24. *Mesoplia (M.) rufipes*, male: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

125230), 5-III-2020, P. Sagot, 2♂ (ECOAB 134690), (ECOAB 134691), E. Gómez, 2♂ (ECOAB 134756), (ECOAB 134757), 16°2'24.00" N, 92°33'36.00" W, 580 m, 5-III-2020, P. Sagot, 1♂ (ECOAB 134785); Mapastepec, 15°31'12.00" N, 92°48'0.00" W, 316 m, 22-II-2006, J. Esponda, 1♂ (ECOAB 25644), 1-IV-2005, M. Rincón, 1♀ (ECOAB 25660); Motozintla de Mendoza, 15°22'48.00" N, 92°19'12.00" W, 1,230 m, 7-II-2011, P. Sagot, 1♂ (ECOAB 25638), 15°19'12.00" N, 92°20'24.00" W, 1,000 m, 3-II-2019, P. Sagot, 1♂ (ECOAB 131078); Ocosingo, 16°54'36.00" N, 93°40'48.00" W, 950 m, 15-IV-2010, J. Mérida, 1♂ (ECOAB 56637); San Juan Cancuc, 16°54'0.00" N, 92°21'36.00" W, 1,170 m, 6-IV-2010, J. Mérida, 1♂ (ECOAB 25654); Siltepec, 15°34'48.00" N, 92°39'0.00" W, 1,709 m, 9-III-2022, L. Arroyo, 1♀ (ECOAB 71706), 1♂ (ECOAB 71705); Tapachula, 14°53'24.00" N, 92°17'24.00" W, 127 m, 9-VI-1989, A.

Aquino, 1♂ (ECOAB 25648), 14°54'0.00" N, 92°18'36.00" W, 102 m, 14-XII-1988, A. Aquino, 2♂ (ECOAB 25649), (ECOAB 25651), 18-I-1989, A. Aquino, 1♂ (ECOAB 25650), 1♀ (ECOAB 25658), M. Cigarroa, 2♂ (ECOAB 25652), (ECOAB 25653), 1♀ (ECOAB 25659); Tonalá, 16°8'24.00" N, 93°40'48.00" W, 407.5 m, 21-V-2009, C. Balboa, 1♂ (ECOAB 56635), 12-VII-2009, C. Balboa, 1♀ (ECOAB 56636), 9-III-2009, M. Guzmán, 1♀ (ECOAB 25655), 16°30'0.00" N, 93°40'48.00" W, 407.5 m, 12-II-2009, C. Balboa, 1♀ (ECOAB 61187), 15°56'24.00" N, 93°49'12.00" W, 6 m, 31-I-2019, I. Pérez, 1♂ (ECOAB 130806), 25-I-1989, M. Cigarroa, 1♂ (ECOAB:66072); Tuxtla Chico, 14°58'12.00" N, 92°10'48.00" W, 395 m, 18-II-1992, M. Medina, 1♀ (ECOAB 56638), 1♂ (ECOAB:25647); Venustiano Carranza, 16°18'60.00" N, 92°33'59.76" W, 570 m, 21-IV-1993, J. L. Neff, 1♀ (EBCH JZ71). Guerrero: Iguala, 18°20'37.00" N, 99°32'21.01" W,

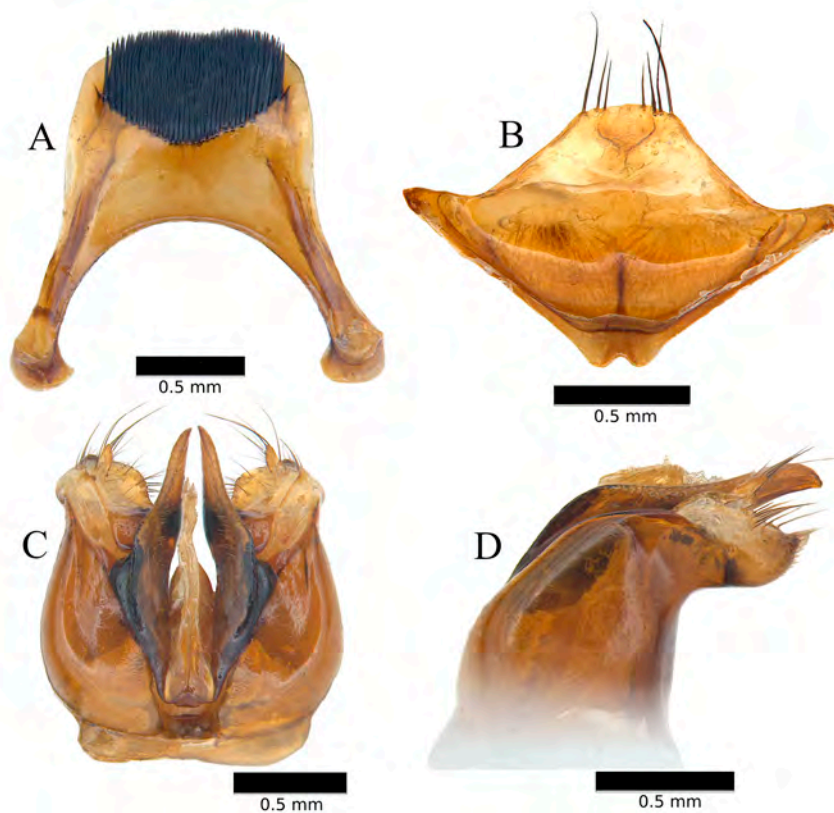


Figure 25. *Mesoplia (M.) rufipes*, male: A, S7. B, S8. C and D, genital capsule, dorsal and lateral view, respectively.

731.52 m, 4-II-1954, R. R. Dreisbach, 1♂ (SEMC 1451084); Tlapa de Comonfort, 17°33'0.00" N, 98°34'48.00" W, 1,063 m, 17-IV-1989, A. Aquino, 1♂ (ECOAB 56634). Jalisco: Cabo Corrientes, 19°39'0.00" N, 105°10'48.00" W, 49 m, 8-IX-2018, J. Mérida 1♀ (ECOAB 121569); El Tuito, 20°21'20.50" N, 105°18'59.96" W, 18-VI-1989, A. Borquez, 1♂ (EBCH JZ79); Jardín Botánico, 20°27'57.64" N, 105°17'30.89" W, 360 m, 26-VII-2014, C. E. Alatorre-Bracamontes y M. Vásquez-Bolaños, 1♂ (CZUG JZ12); La Huerta: Chamela, 19°29'54.77" N, 105°2'41.22" W, 20-VII-1985, R. Ayala, 2♂ (EBCH RA178bis JZ73), 1♂ (EBCH RA178bis JZ76), 19-XI-1989, G. Rodríguez, 2♂ (EBCH JZ74), (EBCH JZ75); Tequila: Volcán de Tequila, 20°51'50.99" N, 103°50'35.00" W, 1,300 m, 15-III-1996, H. E. Fierros-López, 1♂ (HFL JZ11), 15-III-1995, H. E. Fierros-López, 1♂ (CZUG 344); Zapopan: Barranca la Experiencia, 20°44'6.13" N, 103°19'38.38" W, 30-I-1997, G. Mercado, 1♂ (CZUG 1110), 31-VII-1996, G. Mercado, 1♂ (CZUG 1109). Morelos: Temixco: Cuentepec, 18°51'38.16" N, 99°19'30.72" W, 1,485 m, 31-X-2019, D. A. Hernández-Márquez, 1♀ (MZFC 33199), 18°51'27.72"

N, 99°19'40.80" W, 1,455 m, 22-XII-2018, D. A. Hernández-Márquez, 1♀ (MZFC 32554). Querétaro: Jalpan de Serra, 21°13'0.01" N, 99°28'21.00" W, 770 m, 24-V-1989, D. Yanega, 2♀ (SEMC 1451144), (SEMC 1451145). Nayarit: San Blas, 20 km al sur de San Blas, 21°23'25.00" N, 105°6'14.00" W, 10 m, 7-IV-1994, F. Noguera, 1♂ (SMO 328474). Oaxaca: San Pedro Totolapa, 8.04672 km al noroeste de San Pedro Totolapa, 16°43'23.12" N, 96°19'14.27" W, 1,158.24 m, 6-VII-1953, Univ. of Kans. Mex. Exped., 1♂ (SEMC 1451086); Putla Villa de Guerrero, 17°0'36.00" N, 97°57'0.00" W, 849 m, 24-V-2020, Wilebaldo, V., 1♀ (ECOAB 58886). Puebla: Cuetzalan del Progreso, 20°3'36.00" N, 97°28'12.00" W, 413 m, 26-III-2020, L. Arroyo, 1♂ (ECOAB 137985). Sonora: Álamos, La Aduana, 27°2'27.16" N, 109°0'57.91" W, 567 m, 15-III-1962, L. A. Stange, 1♀ (SEMC 1442316). Tabasco: Huimanguillo, 17°49'48.00" N, 93°55'12.00" W, 21 m, 3-VI-2015, P. Sagot, 1♂ (ECOAB 77134). Veracruz: without locality, 1♀ (CERUADY 037ver); Acayucan, 48.2803 km al sur de Acayucan, 17°38'6.41" N, 94°54'14.40" W, 56 m, 21-IV-1962, L. A. Stage, 1♀ (SEMC

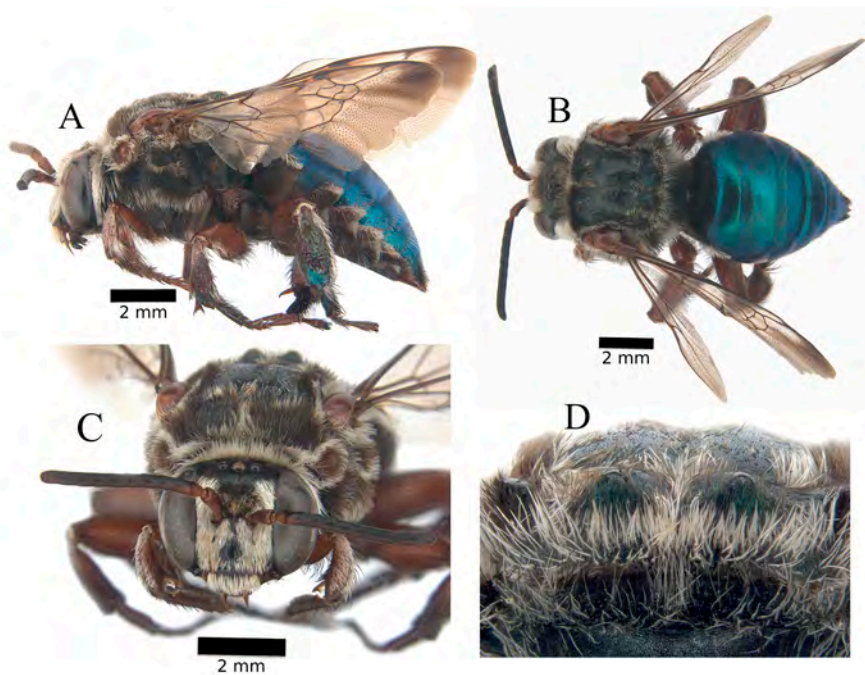


Figure 26. *Mesoplia (M.) rufipes*, female: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, posterior view of the scutellar tubercles.

1442318); Coatepec, 19°26'42.36" N, 96°57'52.13" W, 1,200 m, 1-VI-2020, G. Quintos-Andrade, 3♀ (IEXA JZ40 - IEXA JZ42), 3-VI-2020, G. Quintos-Andrade, 1♀ (IEXA JZ43), 4-VI-2020, G. Quintos-Andrade, 1♀ (IEXA JZ44), 7-VI-2020, G. Quintos-Andrade, 1♀ (IEXA JZ45), 6-VI-2020, G. Quintos-Andrade, 3♀ (IEXA JZ46 - IEXA JZ48); Medellín: Paso del Toro, 4.82803 km SW of Paso del Toro, 19°0'46.43" N, 96°8'39.30" W, 15.24 m, 23-VI-1961, Univ. of Kans. Mex. Exped., 1♂ (SEMC 1451081); Teocelo, Llano Gande, 19°22'13.01" N, 96°52'50.99" W, 833 m, 17-VI-1990, G. Rodríguez, 1♀ (SEMC1451143); Xalapa, 35.4056 km SW of Xalapa, 19°24'20.92" N, 96°38'46.46" W, 335.28 m, 29-VI-1953, Univ. of Kans. Mex. Exped., 1♂ (SEMC 1451176); Veracruz, 18°54'29.30" N, 96°8'16.01" W, 27-III-1951, W. P. Stephen, 1♂ (SEMC 1451083). Yucatán: Izamal, Plaza Izamal, 20°56'1.00" N, 89°1'5.00" W, 15 m, 24-V-1995, W. May, 1♀ (CERUADY 22841(02486)), 1♂ CERUADY 22838(02482), A. Canto, 2♂ (CERUADY 22488(02482)), (CERUADY:22481(02484)); Kinchil, Parque Central Kinchil, 20°55'1.23" N, 89°56'50.18" W, 8 m, 24-V-1995, F. León, 1♂ (CERUADY 019671(02480)), 8-V-1995, R. Rodríguez, 1♂ (CERUADY 021772(02481)); Xmatkuil, CCBA, 20°52'2.86" N, 89°37'28.10" W, 11 m, 18-V-2022, A. Sansores, 1♂ (CERUADY JZ206), 16-V-2022, 1♀ (CERUADY JZ211),

1♂ (CERUADY JZ207). Nicaragua: Rivas: Cárdenas, 11°14'24.00" N, 85°42'36.00" W, 90 m, 26-V-2015, E. Dorgay, 1♀ (ECOAB 66669); San Juan del Sur, 11°6'36.00" N, 85°45'36.00" W, 1 m, 6-IV-2017, M. Calero, 1♀ (ECOAB 80382), 0 m, 6-IV-2017, M. Calero, 1♂ (ECOAB 80393). Panama: Colón, 3.21869 km NW of Gamboa, 9°7'42.46" N, 79°42'55.28" W, 65 m, 21-I-1958, W. J. Hanson, 1♀ (SEMC 1451152); 8 km NW of Gamboa, pipeline road, 9°8'38.63" N, 79°43'38.22" W, 61 m, 12-I-1981, C. D. Michener, 1♀ (SEMC 1451153). Panamá: Zona del Canal, Juan Mina, 9°13'39.67" N, 79°57'2.59" W, 106 m, 22-VI-1945, C. D. Michener, 1♂ (SEMC 1451082); Curundú, 8°59'26.73" N, 79°32'27.29" W, 34 m, 31-III-1981, R. W. Brooks, 1♂ (SMO 725157), 19-V-1981, R. W. Brooks, 4♂ (SMO 725158), (SEMC 1254922 - SEMC1254924). Panamá Oeste: Laguna, Chame, 8°39'53.99" N, 80°6'10.90" W, 792.48 m, 29-IV-1945, C. D. Michener, 1♂ (SEMC1451085); Zona del Canal, Río Corona, 8°28'55.22" N, 80°1'42.15" W, 609.6 m, 3-V-1952, C. W. Rettenmeyer, 1♀ (SEMC 1451146); Isla Barro Colorado, 9°11'0.00" N, 79°51'0.00" W, 21-II-1956, C. W. Rettenmeyer, 1♀ (SEMC 1451147), 16-IV-1956, C. W. Rettenmeyer, 1♀ (SEMC 1451148), 15-II-1956, C. W. Rettenmeyer, 1♀ (SEMC 1254915), 19-II-1956, C. W. Rettenmeyer, 1♀ (SEMC 1254916), 7-III-1967, M.

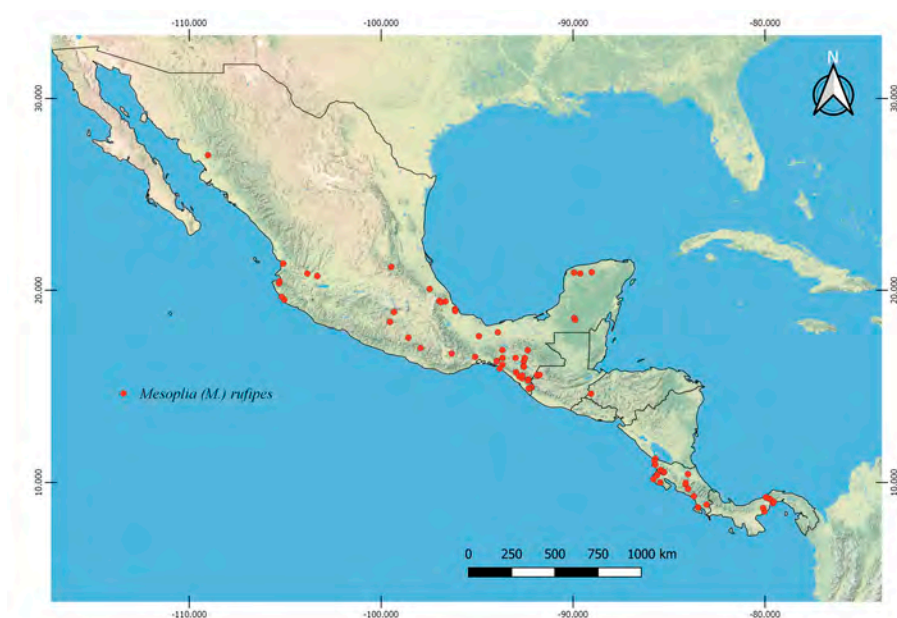


Figure 27. Map with the known distribution of *Mesoplia (M.) rufipes*.

Naumann, 1♀ (SEMC 1451149); Fort Kobbe, 8°55'0.30" N, 79°34'59.59" W, 8 m, 11-I-1960, W. J. Hanson, 1♀ (SEMC 1451150), 1♂ (SEMC 1451151).

Distribution. Registered from south Sonora in northern Mexico, to Brazil, according to opinion of Melo and Genaro (Genaro & Franz, 2008), its distribution is restricted to continental America, so its presence on the islands of the continent would be ruled out (Fig. 27).

Taxonomic comments. Within the genus, it is the species with the widest distribution (Fig. 27), largest number of registered hosts (Table 2). This is possibly a species complex; we did not find morphological characters that allow us to delimit it in a group of species.

Mesoplia (Mesoplia) oaxacana Zamarripa-Fernández & Ayala sp. nov.

(Figs. 4G, 10, 28)

<http://zoobank.org/urn:lsid:zoobank.org:act:DA008E7B-584F-4D7B-89F4-8DE28F0ED32D>

Diagnosis. Female: body metallic blue but black in face and mesosoma and metasoma (Fig. 28); scape with dark integument on the base and reddish brown on apex; pedicel with dark integument; integument of f1 ferruginous, remainder of flagellum dark brown; labrum, without metallic blue scales on vertex, occiput and tegula (or not very evident on tegula (Fig. 28B)); tegula integument dark brown; legs with integument on outer surface of blackish and inner surface dark reddish brown;

with a carina extending laterally from the pronotal collar to the pronotal lobe; conical scutellar tubercles moderately projected, with a median cleft between them (Fig. 28D); tergal pubescence blackish; middle tibial spur forked with dark reddish-brown integument, anterior projection with 4 internal teeth; pygidial plate with a broad apex and almost completely covered by metallic bluish-green scales (Fig. 4G).

Description. Holotype: female. Body length 13.5 mm, forewing length 12.5 mm, head length 3.5 mm, intertegular distance 4.4 mm, T2 length 2.8 mm. Head: mandible with an internal tooth. Labrum subrectangular, surface slightly concave, with a raised preapical margin. Ocelli aligned to the upper margin of the eyes, protruding above the head in lateral view. Mesosoma: with a carina extending laterally from the pronotal collar to the pronotal lobe. Scutum convex in lateral view. Scutellar tubercles conical, without posterior carina, with an evident cleft between them. Vertical metanotum and propodeum. Short pointed middle tibial spine. Medial tibial spur bifurcated, anterior projection with 4 internal teeth. Medium basitarsus with tridentate external margin and with a thin flattened distal process slightly curved externally. Metasoma: broad pygidial plate at the base, and with a broad rounded apex (Fig. 4G). Color: integument blackish to dark reddish brown. Head: scape mostly blackish, with dark reddish brown upper outer edge. Pedicel also bicolor. F1 ferruginous, remainder of flagellum brown.

Table 2

Known host associations for species of *Mesoplia* Lepeletier, 1841.

Cleptoparasite	Hosts	Relationship record	Type of evidence	Reference
<i>Mesoplia</i> (M.) <i>bifrons</i> (Fabricius, 1804)	<i>Centris</i> (Centris) <i>caxiensis</i> DUCKE, 1907	Brazil	Confirmed	Rocha-Filho et al. (2009)
<i>Mesoplia</i> (M.) <i>cubensis</i> Genaro & Breto, 2022	<i>Centris</i> (Centris) <i>poecila</i> Lepeletier, 1841	Cuba	Probable	Genaro and Breto (2022)
<i>Mesoplia</i> (E.) <i>decorata</i> (Smith, 1854)	<i>C.</i> (Centris) <i>flavofasciata</i> Friese, 1900	Costa Rica, Guanacaste	Presumed	Vinson et al. (1987)
<i>Mesoplia</i> (M.) <i>dugesii</i> (Cockerell, 1917)	<i>C.</i> (Exallocentris) <i>aterrima</i> Smith, 1854	Mexico	Suspected	Snelling (1984)
<i>Mesoplia</i> (M.) <i>insignis</i> (Smith, 1879)	<i>C.</i> (Acritocentris) <i>agilis</i> Smith, 1874	Mexico, Jalisco	Probable	This work
<i>Mesoplia</i> (M.) <i>regalis</i> (Smith, 1854)	<i>C.</i> (Centris) <i>flavofasciata</i> Friese, 1900	Costa Rica, Guanacaste	Confirmed	Vinson et al. (1987)
	<i>C.</i> (Centris) <i>flavifrons</i> (Fabricius 1775)	Brazil, Paraíba	Confirmed	Martins et al. (2014)
<i>Mesoplia</i> (M.) <i>rufipes</i> (Perty, 1833)	<i>C.</i> (Centris) <i>aenea</i> Lepeletier, 1841	Brazil, Cerrado	Probable	Aguiar and Gaglianone (2003); Rocha-Filho et al. (2009)
	<i>C.</i> (Centris) <i>flavofasciata</i> Friese, 1900	Costa Rica, Guanacaste	Presumed	Vinson et al. (1987)
	<i>C.</i> (Centris) <i>varia</i> (Erichson, 1848)	Costa Rica, Guanacaste	Confirmed	Coville et al. (1983)
	<i>C.</i> (Trachina) <i>carrikeri</i> Cockerell, 1919	Trinidad and Tobago	Confirmed	Rozen (1969)
	<i>C.</i> (Paracentris) <i>nigrocaerulea</i> Smith, 1874	Mexico, Morelos	Suspected	This work
	<i>C.</i> (Centris) <i>meaculpa</i> Snelling, 1984	Mexico, Chiapas	Probable	Mérida-Rivas, pers. com.
	<i>Centris</i> (C.) <i>aethyctera</i> Snelling, 1974	Costa Rica, Guanacaste	Probable	Lobo et al. (2023)
	<i>Epicharis</i> (Anepicharis) <i>dejeanii</i> Lepeletier 1841	Brazil, Rio Grande do Sul	Confirmed	Hiller and Wittmann (1994)
	<i>E.</i> (Xanthepicharis) <i>bicolor</i> Smith, 1854	Brazil, Minas Gerais	Confirmed	Rocha-Filho et al. (2008)
	<i>E.</i> (Xanthepicharis) <i>nigrita</i> Friese, 1900	Brazil, São Paulo, Paraíba	Confirmed	Gaglianone (2005); Martins et al. (2019)
	<i>E.</i> (Epicharoides) <i>albofasciata</i> Smith, 1874	Trinidad and Tobago	Confirmed	Rozen (1969; 2016)
	<i>E.</i> (Epicharoides) <i>picta</i> (Smith, 1874)	Brazil, Minas Gerais	Presumed	Werneck and Campos (2020)
<i>Mesoplia</i> (M.) <i>sapphirina</i> Melo & Rocha-Filho, 2011	<i>C.</i> (Centris) <i>flavofasciata</i> Friese, 1900	Mexico, Jalisco; Costa Rica, Guanacaste	Confirmed	Rozen et al. (2011)
	<i>Centris</i> (C.) <i>aethyctera</i> Snelling, 1974	Costa Rica, Guanacaste	Probable	Lobo et al. (2023)

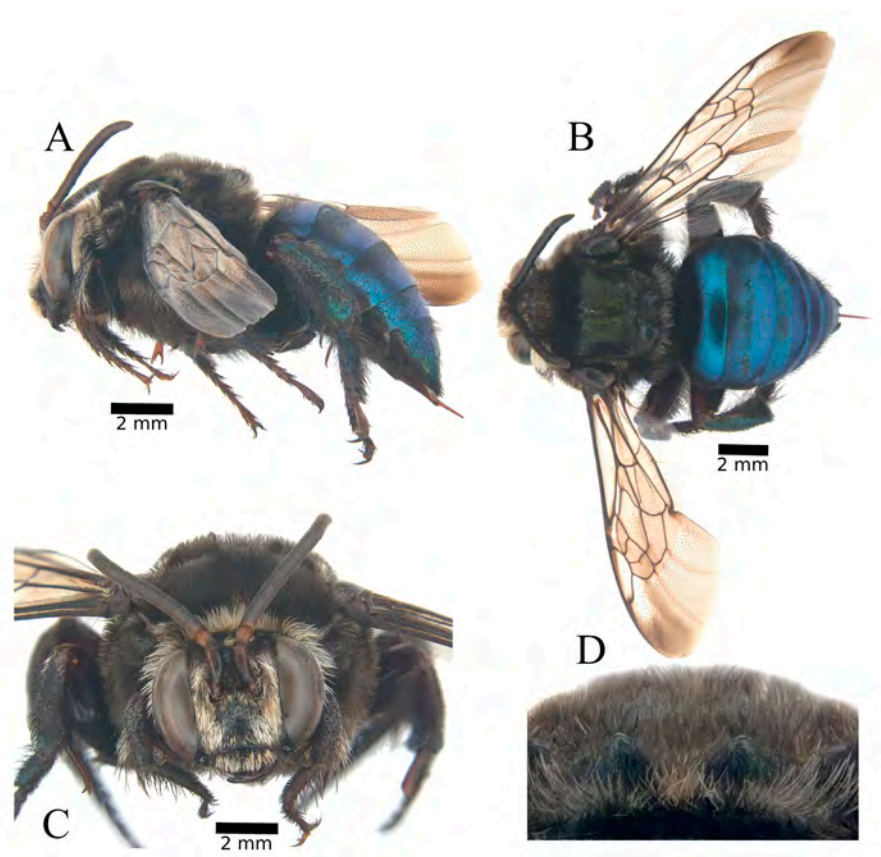


Figure 28. *Mesoplia* (*M.*) *oaxacana* sp. nov. Holotype, female: A, lateral habitus; B, frontal habitus; C, dorsal habitus; D, scutellar tubercles posterior view.

Basal and apical region of the mandible dark, with a yellowish brown area in the base of the teeth and reddish brown near the base. Mesosoma: pronotal lobe and tegula blackish. Wings almost transparent. Forewings with the anterior edge and the distal apex of the marginal cell darker, also presenting a darker spot that goes from the external edge of the 2r-m to the wing apex (Fig. 28B). Very dark veins. Inner surfaces of legs dark reddish brown, outer surfaces blackish. Apex of distal process of middle basitarsus blackish. Middle tibial spur reddish-brown. Metasoma: sterna blackish, except for S6 which is reddish brown. Surface sculpture: head. Labrum with most surface rugose, basal edge polished. Mesosoma: punctured tegula. Dotted propodeum. Metasoma: dotted pigdial plate. Pubescence: approximately the same proportion of blackish and whitish. Head: labrum discal area with white plumose setae and scattered simple black setae; lower edge with a pair of long dark tufts; lateral edges with simple black setae and upper edge bare. Clypeus and supraclypeal area, with lateral with white

plumose setae, discal surface with little pubescence, some elongated black simple setae evident in lateral view. Frons with brown setae. Paraocular area with white plumose setae. Vertex and preoccipital region with white setae. Gena with white setae, except for the darks on lower area. Mesosoma: pronotal lobe, with the inner and posterior margins with white setae, rest with blackish setae, with light metallic green scales, only slightly evident in frontal view. Mesepisternum with blackish setae, with a thick longitudinal white line. Scutum covered mainly by black setae, except for the lateral edges near the posterior two-thirds of the tegula that have white setae, a central disc with light metallic green scales. Tegula with black setae on the anterior margin and white on the posterior, and with few light metallic green scales on the inner margin, only slightly evident in the opposite lateral view. Scutellum, upper area with few black setae and light metallic blue scales, posterior part with white setae project a little between the tubercles, also with light metallic blue scales in posterior view. Metanotum blackish. Propodeum upper

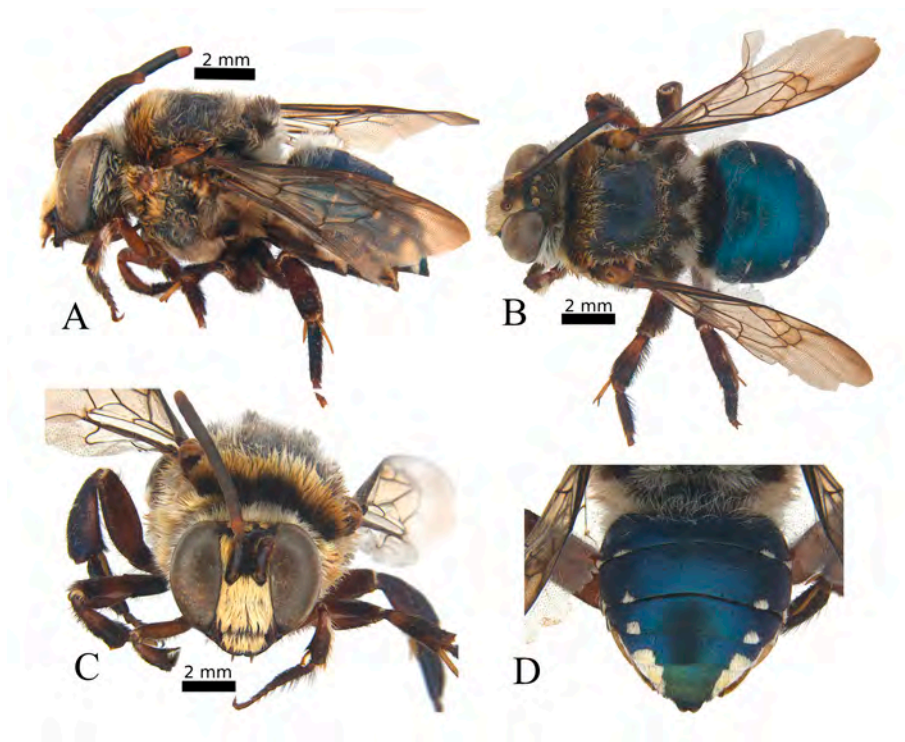


Figure 29. *Mesoplia* (*E.*) *carmelitae* sp. nov. Holotype, male: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, detail of the metasoma.

region naked, posterolateral region blackish. Mainly black legs. Outer surface of anterior tibia with a few light metallic green scales, some white plumose setae and simple blackish elongated setae and also present on the basitarsus. With light metallic blue scales evident on the outer surface of the tibia and basitarsus of the middle and hind legs. Metasoma: terga covered with metallic blue-green scales and setae almost black and simple, except on the side of T5, S2 to S4. T6, with thick black setae on the sides; pygidial plate with light metallic green scales that do not reach the apex (Fig. 4G); sterna with scattered black setae.

Male: unknown.

Taxonomic summary

Type material. Holotype: ♀ ECOAB 74052 MEX. OAX [Mexico, Oaxaca], Santiago Nacaltepec, 17°28'12.00" N, 96°49'12.00" W, 1,377 m, 4-XII-2014, L. M. Reyes (ECOAB).

Etymology. The name *oaxacana* makes reference to the known distribution of this species, the state of Oaxaca.

Distribution. It is only known from the type locality (Fig. 10).

Taxonomic comments. This species is similar to *M. dugesi* since the majority of the pubescence is dark. But this species has few metallic scales on the face (Fig. 28C) and tegula (Fig. 28B), and the apex of the pygidial plate is broad (Fig. 4G).

Subgenus *Eumelissa* Snelling & Brooks, 1985

Eumelissa Snelling & Brooks, 1985: 21. Type species: *Melissa decorata* Smith, 1854: British Museum Natural History, London, England (♀), by original designation.

Diagnosis. Male: posterior tibia, distal inner surface without a conspicuous setal brush (Fig. 3F, G); hind tibial spurs reaching to or beyond middle of basitarsus, both present. Female: pygidial plate narrow, does not completely occupy the exposed dorsal surface of T6; pygidial plate glabrous (Figs. 4H, 23D); dorsal surface of posterior coxa abruptly rounded at the junction with lateral surfaces.

Mesoplia (*Eumelissa*) *carmelitae* Zamarripa-Fernández & Ayala sp. nov.

(Figs. 1D, 2D, 3F, 4H, 7F, 10, 16D, 18D, 29-31)

<http://zoobank.org/urn:lsid:zoobank.org:act:F0E953A9-E4CE-4A6E-B988-F71C31106113>

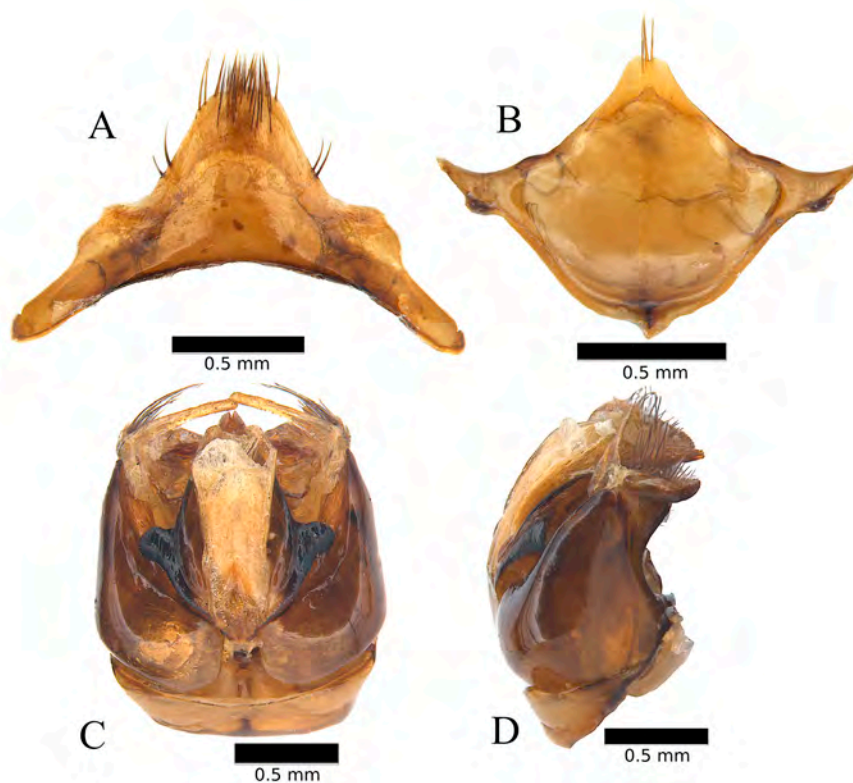


Figure 30. *Mesoplia (E.) carmelitae* sp. nov. Holotype, male: A, S7. B, S8. C and D, genital capsule, dorsal and lateral view, respectively.

Diagnosis. Male: body metallic blue, with mostly whitish pubescence; whitish-yellowish pubescence on the face, except for the frons, which has brown pubescence; scape and pedicel with integument dark; basal and apical flagellomere, pronotal lobe, tegula and legs with integument ferruginous; anterior region of the scutellar disc pubescence with a color pattern that goes from blackish in the anterior region, brownish-yellowish to whitish (Fig. 29B); scutellar tubercles flattened; forked spur of middle tibia ferruginous, becoming dark at apex, both branches short, external apex with 3 or 4 internal teeth (Fig. 16D). Terga pubescence whitish, with a pair of white spots with short pubescence in the marginal area of T2 to T6 (Fig. 29D); forked apex of T7, both tips truncated and bare, median cleft shallow (Fig. 7F); S4 bilobed, with a band of very short, dark hairs on the distal margin; dorsal lobe of the gonostylus elongated and projected towards the penis valvae (Fig. 30C, D).

Female: body metallic blue, with mostly whitish pubescence; F1 shorter than F2; scape and pedicel integument reddish brown; F1, pronotal lobe, tegula and legs integument ferruginous; pubescence of the

anterior region of the scutum short and branched, with a characteristic pattern that transversely intersperses spots of whitish and blackish setae (Fig 20B); scutellar tubercles flattened with a superficial cleft between them and with short, bushy black pubescence on the apical edge; terga pubescence whitish; with a pair of white spots with short pubescence in the marginal area of T2 to T4 (Fig. 31A); mesosoma and metasoma, ventral surface with metallic blue scales; middle tibial spur forked with ferruginous integument, becoming dark at apex, both branches short, external apex with a series of 3 or 4 short internal teeth (Fig. 18D); pygidial plate narrow at the base, does not cover the entire posterior margin of T5, glabrous, without scales or hairs (Fig. 4H).

Description. Holotype: male. Body length, 11.3 mm (10.8-11.9; n = 4), forewing length 9.4 mm (9.1-10; n = 4), head length 3.4 mm (3.4-3.5; n = 4), intertegular distance 3.3 mm (2.8-3.5; n = 4), T2 length 1.729 mm (1.6-1.8; n = 4). Head: mandible with an internal tooth. Labrum subrectangular, flat surface, with a slightly elevated preapical margin. Ocelli aligned to the upper margin of the eyes, protruding only a little above the head in

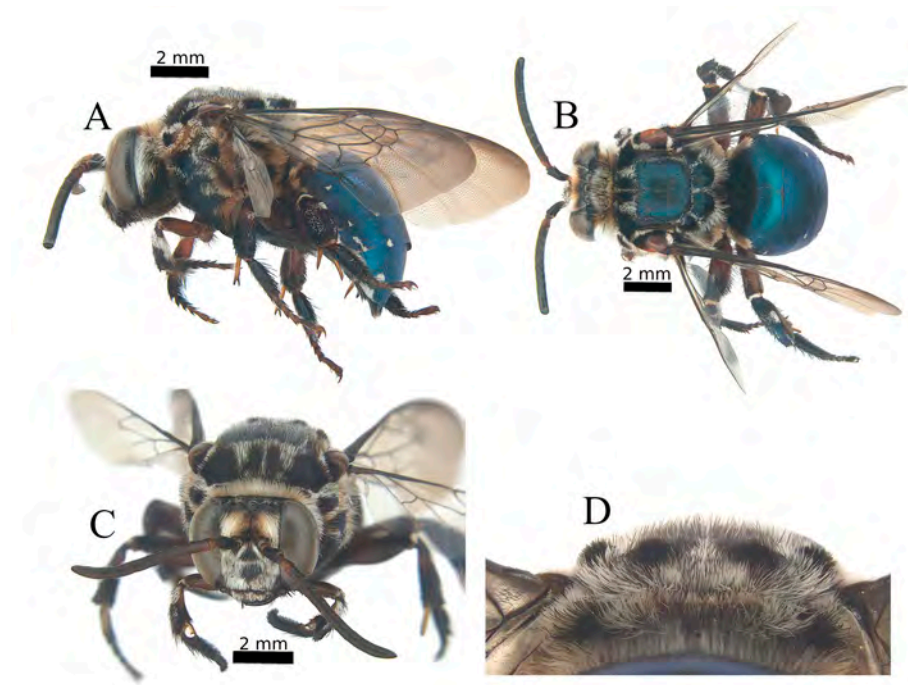


Figure 31. *Mesoplia (E.) carmelitae* sp. nov. Allotype, female: A, lateral habitus; B, frontal habitus; C, dorsal habitus; D, posterior view of the scutellar tubercles.

lateral view. Mesosoma: convex scutum in lateral view. Scutellar tubercles with a flattened surface, a superficial cleft between them. Vertical metanotum and propodeum. Medial tibial spine short pointed (Fig. 1D). Medial tibial spur bifurcated near the apex, noticeably elongated, internal tip with a single thin elongated tooth, external tip with a series of 3 or 4 internal teeth (Fig. 16D). Medial basitarsus with posterior margin smooth and with short and straight flattened distal process (Fig. 1D). Posterior femur thin. Posterior tibia with 2 spurs at the apex, the inner one longer than the outer one (Fig. 3F). Metasoma: T7 with a flattened surface, bifurcated, with a shallow central cleft, short distance between the apices, both ends truncated (Fig. 7F). Color: blackish to ferruginous integument. Head: ferruginous labrum. Blackish face. Ferruginous scape (some specimens with a reddish spot at the apex). Dark brown pedicel. Ferruginous F1 and F11, remainder of flagellum brown. Apical third of the mandible with apical third blackish (some specimens with yellowish-brown tints), rest dark reddish brown. Mesosoma: ferruginous pronotal lobe and tegula. Blackish mesepisternum. Apex of distal process of middle basitarsus reddish brown. Spur of the middle tibia mainly ferruginous, with blackish apices. Wings almost transparent. Forewings with the anterior edge of the marginal cell darker, also presenting

a subtly darkened spot that goes from the outer apex of the marginal cell to the wing apex. Brown veins. Ferruginous legs. Blackish propodeum. Metasoma: ferruginous sterna. Surface sculpture: head. Labrum with most of the surface rugose, the basal edge polished. Mesosoma: punctured tegula. Dotted propodeum. Metasoma: polished T7 apical surface. Pubescence: mainly whitish. Head: labrum discal area with pale yellowish plumose setae; lower edge with a pair of long brown tufts; lateral edges with simple brown setae and upper edge bare. Clypeus and supraclypeal area, with pale yellowish plumose setae. Frons with brown setae. Paraocular area with pale yellowish plumose and simple setae, some specimens with bright yellow setae in the upper region. Vertex and preoccipital region with white compound setae. Gena with white compound setae, except for the brown on lower area. Mesosoma: pronotal lobe, with yellowish anterior margins, white lateral and posterior margins, practically naked posterior surface. Mesepisternum anterior margin with bright yellow and brown setae, some specimens with the lower portion with a black spot, rest of the surface white except for a spot of black setae below the tegula. Scutum anterior area with a characteristic pattern that goes from blackish, passing through yellowish-brown, until reaching whitish in the region of the discal surface, the latter with metallic blue

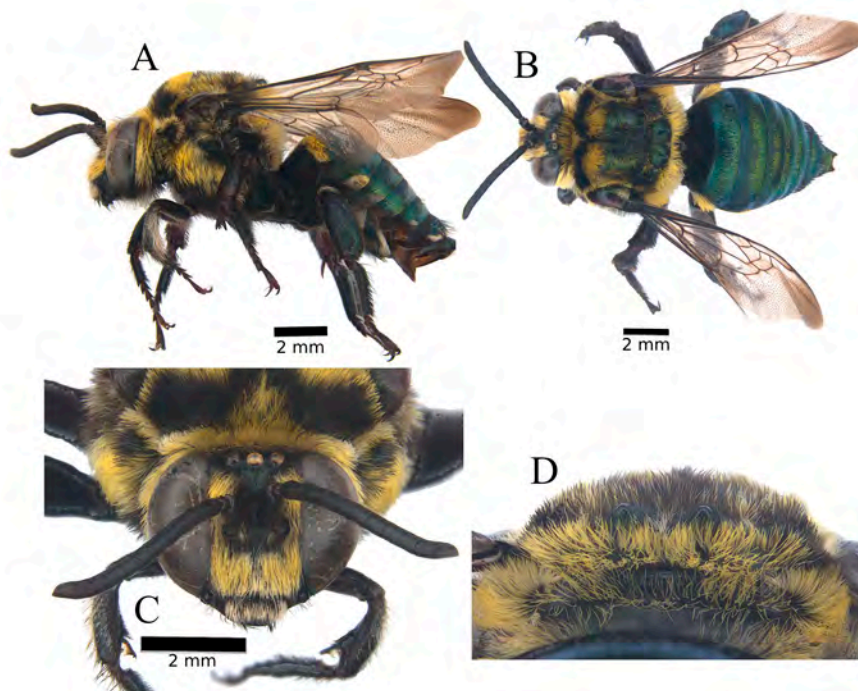


Figure 32. *Mesoplia (E.) ornata*, male: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, scutellar tubercles posterior view (photos A, B by Jorge Mérida).

scales and scattered setae (Fig. 29B). Axilla lateral edges with black setae. Tegula with white setae on the inner anterior edge and at the posterior apex, and black on the inner and outer anterior edge, rest of the surface bare. Scutellum upper region with few scattered short black setae and metallic blue scales, scutellar tubercles posterior apices with long black setae and with a line of short, branched white setae between them, posterior area with long white, branched setae (Fig. 29B). Metanotum with white setae. Propodeum upper region naked, posterolateral region whitish-light brown. Legs mainly dark. Anterior tibia outer surface scaleless, with a tuft of short plumose white setae on the outer basal surface, with long simple dark setae running from the outer apex of the tibia and extending along the basitarsus. External surface of middle and posterior tibia and basitarsus with metallic blue scales evident on the external surface. Coxa and trochanter with simple long white setae scattered. Metasoma: terga and sterna with metallic blue scales. Sternum disc with scattered long thin white setae. Anterior edge of T1 with thin white moderately bushy setae, lateral edges with a white patch of short plumose setae. Marginal zone of T2 to T4 with a pair of white spots with short pubescence, from T4 onwards they tend to merge with a lateral spot

(Fig. 29D). T7 with simple black setae on the sides. T1 to T6 with a lateral stripe of short, branched setae. Sterna setae scattered black. S4 with short, branched brown setae near the apex and with several rows of simple black setae. S2 to S4 with a more or less triangular white spot on the lateral margins.

Allotype: female. Body length 12.3 mm (11-14.3; n = 3), forewing length 12.3 mm (9.3-17.5; n = 3), head length 3.5 mm (n = 3), intertegular distance 3.5 mm (3.4-3.6; n = 3), T2 length 1.8 mm (1.6-1.9; n=3). Head: mandible with an internal tooth. Labrum subrectangular, surface flattened, with a subtly raised preapical margin. Ocelli aligned to the upper margin of the eyes, protruding only a little above the head in lateral view. Mesosoma: convex scutum in lateral view. Scutellar tubercles flattened, with a superficial cleft between them (Fig. 31A, D). Vertical metanotum and propodeum. Medial tibial spine short pointed. Medial tibial spur notably elongated bifurcated near apex, inner tip with a single slender tooth elongated and curved posteriorly, outer apex has a series of 3 or 4 short inner teeth curved anteriorly (Fig. 18D). Basitarsus medium with smooth posterior margin and with flattened distal process slightly curved externally (Fig. 2D). Metasoma: narrow pygidial plate at the base, forming

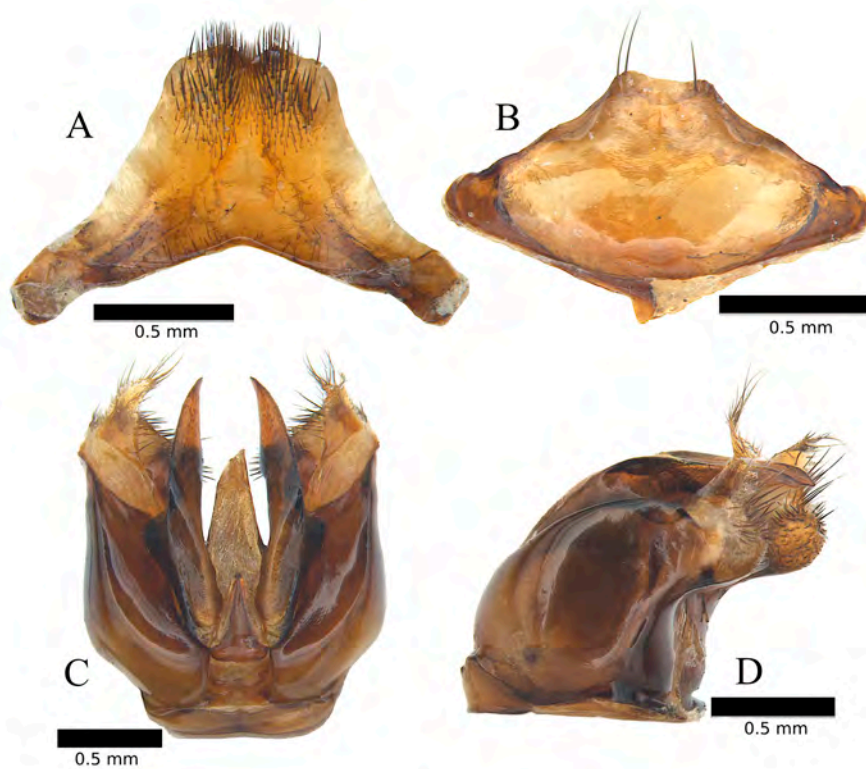


Figure 33. *Mesoplia (E.) ornata*, male: A, S7. B, S8. C and D, genital capsule, dorsal and lateral view, respectively.

an angle of approximately 30°, apex rounded (Fig. 4H). Color: blackish to ferruginous integument. Head: scape with dark brown inner edge, rest ferruginous. Pedicel also bicolor, dark brown and ferruginous. Flagellum goes from ferruginous in the basal region to dark brown in the distal region. Apical third of mandible blackish, base dark reddish brown, with a yellowish-brown region at base of teeth extending approximately to end of first third. Mesosoma: pronotal lobe, tegula, upper region of the mesepisternum ferruginous. Wings almost transparent; forewings with the anterior edge of the marginal cell darker, also presenting a subtly darkened spot that goes from the outer apex of the marginal cell to the wing apex. Brown veins. Ferruginous legs. Blackish propodeum. Metasoma: dark pygidial plate. Ferruginous sterna. Surface sculpture: head. Labrum with most of the surface rugose, basal edge polished. Mesosoma: punctured tegula. Dotted propodeum. Metasoma: polished pygidial plate. Pubescence: mostly whitish with some blackish areas. Head: labrum with a thick transverse central band of branched white setae and with few scattered brown simple setae; lower edge with a pair of long brown tufts and some short simple brown setae; lateral edges with simple short brown setae and upper edge bare. Clypeus and

supraclypeal area with short white plumose setae, discal area with little pubescence, some simple elongated white setae evident in lateral view. Scape with a tuft of short white plumose setae at the outer edge. Frons with brown setae. Paraocular area with short white plumose setae and some long simple. Vertex and preoccipital region with white compound setae. Gena with white compound setae, except for the lower region that has brown. Mesosoma: pronotal lobe with lateral and posterior margins with short white compound setae, with scattered simple blackish setae (Fig. 31C); anterior surface with metallic blue scales, evident in frontal view; discal surface practically naked. Surface surrounding the pronotal lobe with a thick strip of light brown branched short pubescence. Mesepisternum upper surface mainly with white branched short setae, lower surface with metallic blue scales. Scutum anterior area with short and branched setae, with a characteristic pattern, central area with a thin whitish stripe, followed on both sides by a more or less rectangular blackish spot, these followed by a more or less rectangular whitish spot, after them, a quadrangular blackish spot bordered by whitish setae (the whitish areas have interspersed dark setae); discal area with scattered short simple white setae and metallic blue scales, lateral edges with branched

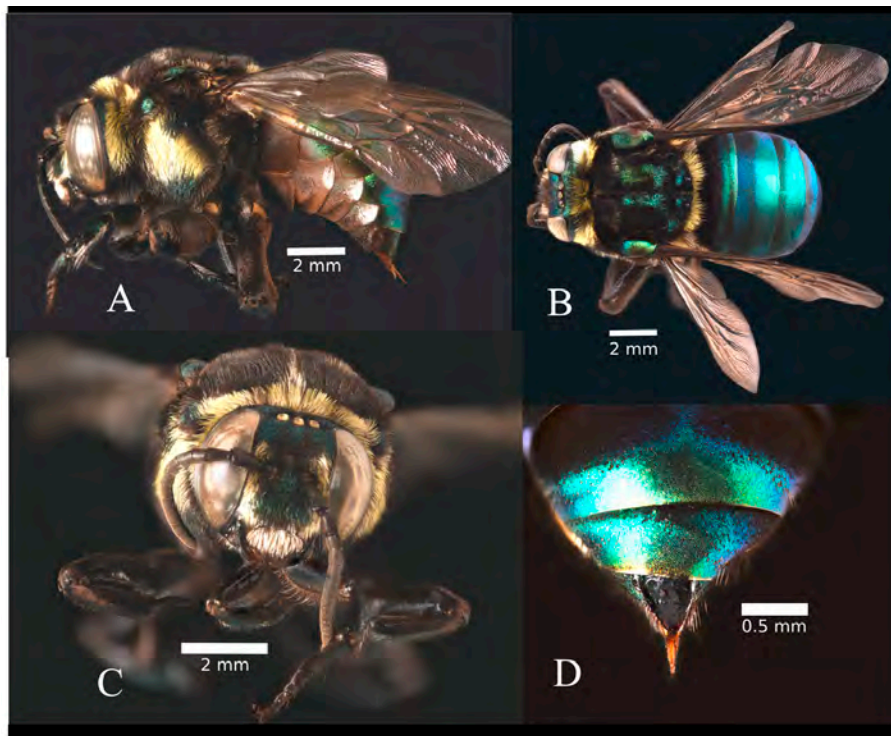


Figure 34. *Mesoplia (E.) ornata*, female: A, lateral habitus; B, dorsal habitus; C, frontal habitus; D, pygidial plate (photos by Nicolás Rengifo).

short white setae. Tegula with white setae on the inner anterior edge and at the posterior apex, and black on the inner and outer anterior edge, rest of the surface bare. Scutellum upper region with few scattered short black setae and metallic blue scales; bushy black setae at the posterior apices of the tubercles and with a line of short, branched white setae between them, posterior region with long white, branched setae (Fig. 31B, D). Metanotum with white setae. Propodeum upper region naked, posterolateral region whitish-light brown. Legs mainly dark. Anterior tibia outer surface scaleless, with a tuft of short plumose white setae on the outer basal surface, with long simple dark setae running from the outer apex of the tibia and extending along the basitarsus. External surface of middle and posterior tibia and basitarsus with metallic blue scales evident on the external surface. Coxa and trochanter with simple long white setae scattered. Metasoma: terga and sterna with metallic blue scales. Anterior edge of T1 with white simple long setae, lateral apices with a whitish light brown spot. Marginal zone of T2 to T4 with a pair of white spots with short pubescence, in T4 they tend to merge with a lateral spot. Lateral margins of T2 to T5 and S2 to S4 with a strip of short white setae (Fig. 31A). T6 with thick black

setae on the sides of the naked pygidial plate. Sterna with scattered black setae.

Variation. Some males from Costa Rica also present yellow setae on the white spots of T4 to T6, the white pubescence spots appear from T1 and they all tend to be fused together.

Taxonomic summary

Type material. Holotype: ♂ ECOAB 566228, MEX. CHIS [Mexico, Chiapas], Arriaga, 16°13'48.00" N, 93°58'48.00" W, 367.5 m, 10-III-2009, R. Vargas (ECOAB). Allotype: ♀ ECOAB 134689, MEX. CHIS [Mexico, Chiapas] La Concordia, 16°3'36.00" N, 92°34'48.00" W, 550 m, 5-III-2020 P. Sagot (ECOAB). Paratypes: ♀ MZUCR HY6837, CR. GUA [Costa Rica, Guanacaste], La Cruz, Cuajiniquil Bahía Tomás, Salinitas, in mangrove, 10°55'17.40" N, 85°42'57.96" W, 7-III-2022/18-III-2022, M. M. Chavarría & P. Hanson (MZUCR); ♂ MZUCR HY10213, CR. GUA [Costa Rica, Guanacaste], La Cruz, Cuajiniquil, Parque Nacional Santa Rosa, 10°54'19.51" N, 85°46'11.78" W, 80 m, 20-II-2024, M. F. Otárola, M. Solano & M. M. Chavarría (MZUCR); ♂ MZUCR HY10221, 10°54'49.68" N, 85°48'15.41" W, 33 m, 21-II-2024, M.



Figure 35. Species of *Mesoplia* in nature. A-B, *Mesoplia* (*M.*) *insignis* on *Ramirezella* sp. in Jalisco, México. A, male; B, female (photos by the first author). C, *Mesoplia* (*M.*) *tica* sp. nov. female on *Stachytarpheta* sp. in Alajuela, Costa Rica (photo by Daniel Garrigues). D, *Mesoplia* (*M.*) *veracruzana* sp. nov. female on *Ipomoea* sp. in Veracruz, Mexico (photo by Gerardo Quintos-Andrade). E, *Mesoplia* (*M.*) *dugesi* male on *Tecoma stans* in Querétaro, Mexico (photo by Belem Hernández). F, *Mesoplia* (*M.*) *rufipes* male on *Duranta* sp. in San José, Costa Rica (photo by “Homúnculo Daimon”).

F. Otárola, M. Solano & M. M. Chavarría (MZUCR), ♂ MZUCR HY10257, 10°50'20.40" N, 85°37'4.80" W, 295 m, 7-II-2019, J. Lobo (MZUCR), same data as the previous one, ♀ MZUCR HY10257; ♂ ECOAB 566230, GU. HUE [Guatemala, Huehuetenango], San Antonio Huista, 15°40'12.00" N, 91°57'36.00" W, 1,007 m, 20-II-2010, J. Mérida (ECOAB). Same locality as the holotype, 2♀ ECOAB 566231, 566232, 13-III-2009, C. Balboa

(ECOAB); same data as the allotype, ♀ ECOAB 134688 (ECOAB); ♂ ECOAB 566229, MEX. CHIS [Mexico, Chiapas], Tonalá, 16°8'24.00" N, 93°40'48.00" W, 407.5 m, 19-I-2009, C. Balboa (ECOAB); ♂ ECOAB 67237, MEX. CHIS [Mexico, Chiapas], Chiapilla, 16°33'0.00" N, 92°0'0.00" W, 561 m, 1-I-2017, P. Sagot; ♂ ECOAB 67320, MEX. CHIS [Mexico, Chiapas], Venustiano Carranza, 16°21'0.00" N, 92°37'12.00" W, 597 m,

1-II-2017, P. Sagot (ECOAB); ♂ ECOAB 67390 MEX. CHIS [Mexico, Chiapas], Solcotenango, 16°9'0.00" N, 92°22'48.00" W, 723 m, 14-I-2017, P. Sagot. (ECOAB); ♂ ECOAB 125155, MEX. CHIS [Mexico, Chiapas], Nicolás Ruiz, 16°28'12.00" N, 92°36'0.00" W, 890 m, 8-III-2020, P. Sagot (ECOAB); ♀ ECO-TAE57096, MEX. CHIS [Mexico, Chiapas], Arriaga, ej. López Mateos, 16°20'46.60" N, 93°58'26.80" W, 255 m, 10-III-2009, C. Balboa, M. Guzmán & M. Cigarroa (EBCH). Same data as the previous one, 2♀ ECO-TAE57326, ECO-TAE57327, 3♂ ECO-TAE67405, ECO-TAE57406, ECO-TAE57407. ♀ HFL JZ5, MEX. JAL [Mexico, Jalisco], La Huerta, Chamela, Estación biológica, vereda Chachalaca, 19°29'37.20" N, 105°2'44.94" W, 300 m, 9-IV-2014/11-IV-2014, E. Ramírez & A. Estrada (CZUG); ♀ CNIN-AP 009852, MEX. OAX [Mexico, Oaxaca], Santa Maria Huatulco, Parque Nacional Huatulco, 15°45'59.40" N, 96°12'11.00" W, 14-IV-2022, A. Saldivar & P. Benítez (CNIN).

Other material examined. ♂ MZUCR HY5700, no collection data (MZUCR).

Etymology. This species is dedicated to Luz del Carmen Fernández Rodríguez, mother of the first author. The noun is feminine and declined in the genitive case.

Distribution. It is only known from Jalisco, Oaxaca and Chiapas in Mexico, Huehuetenango in Guatemala and Guanacaste in Costa Rica, it is highly probable that it is also found in Belize, El Salvador, Honduras and Nicaragua (Fig. 10).

Taxonomic comments. This species is easily recognizable by the middle tibial spur with 2 short arms in respect to the rest of the spur (Figs. 29D, 33D) and with spots of whitish setae on the sublateral area of T2 to T6 in males (Fig. 29D) and T2 to T4 in females (Fig. 31A).

Mesoplia (Eumelissa) ornata (Spinola, 1841)

(Figs. 1E, 3G, 7G, 10, 32-34)

Mesochaira ornata Spinola, 1841: 145. Holotype: Museo Regionale di Scienze Naturale, Torino, Italy (♀). Type locality: French Guiana, Cayenne.

Diagnosis. Male: body metallic green, bright yellow and black pubescence (Fig. 32); integument of the antenna, pronotal lobe, tegula and legs black, except for some internal regions of the hind leg which are dark reddish; pubescence of the head and mesosoma mostly bright yellow; conical scutellar tubercles, with a noticeable cleft

between them; short and wide forked medial tibial spur, with dark reddish integument that becomes blackish at the apex, wide anterior projection, with 2 to 3 internal teeth (Fig. 3G); pubescence of the terga mainly whitish with a bright yellow maculation on both lateral margins of T1 and T2 (Fig. 32A, B); apex of T7 forked, both pointed and bare at tip, median cleft shallow but fairly wide, separating apices considerably (Fig. 7G); S4 bilobed, with several rows of compound pubescence on the apical margin, dark in color in the center and becomes light in the middle of the apices and continues that color towards the lateral edges of the lobes; digitiform and dorsal lobe of the gonostylus of similar size (Fig. 33C, D).

Female: body metallic blue, black and pale yellow pubescence (Fig. 34); integument of antenna, pronotal lobe, tegula and legs black; F1 a little longer than F2; yellowish pubescence in preoccipital region, gena, collar of the pronotum, a broad band in the center of the mesepisternum, the posterior region of the scutellum and metascutum; conical scutellar tubercles, projecting upwards with an evident cleft between them; robust medial tibial spur, bifurcated practically in half, internal tip curved posteriorly, has an internal tooth that in some cases is located on the bifurcation, external apex wider, has 2 internal teeth; pygidial plate, narrow at the base, rounded apex, forming an angle of approximately 35°, glabrous, without scales or hairs (Fig. 34D).

Taxonomic summary

Material examined. Costa Rica: Guanacaste: Estación Biológica Maritza, 10°57'25.06" N, 85°29'42.01" W, 573 m, 1988/1999, 1♀ (MZUCR HY6820), 1990, 1♀ (MZUCR HY6822). Mexico: Chiapas: La Concordia, 15°58'48.00" N, 92°48'36.00" W, 581 m, 2-III-2016, P. Sagot, 1♂ (ECOAB 76697).

Distribution. Previously it had only been recorded in South America. If the identity of this species is confirmed, its distribution would expand to southern Mexico in Chiapas (Fig. 10).

Taxonomic comments. The male is similar to *M. insignis* due to the yellow coloration of the mesosoma. It is differentiated among other characters by the lack of pubescence brush on the inner margin of the posterior tibia (Fig. 3G) and by the shape of the T7 whose internal notch resembles a semicircle (Fig. 7G).

Key for species of *Mesoplia* Lepeletier, 1841 of Mexico and Central America.

Males

1. Distal inner surface of the posterior tibia, with a setal brush (Fig. 3A-E); hind tibial spurs not reaching beyond basal third of basitarsus, some species with only 1 spur present [*M. (Mesoplia)*] 2
 - Distal inner surface of the posterior tibia, without a setal brush (Fig. 3F, G); hind tibial spurs reaching to or beyond middle of basitarsus (Fig. 3F), both present *M. (Eumelissa)* 7
 - 2(1). Inconspicuous hind tibia setal brush (Fig. 3D, E); 1 spur on the posterior tibia; ventral basal surface of posterior femur with a robust posterior projection; inner surface of posterior basitarsus with a longitudinal carina (Group *azurea*) 3
 - Conspicuous hind tibia setal brush (Fig. 3 A-C); 2 spurs on the posterior tibia; ventral basal surface of posterior femur without a robust posterior projection; inner surface of posterior basitarsus without a longitudinal carina (Group *bifrons*) 4
 - 3(2). Setae of most of the body mainly dark; metallic scales on the tegula present (Fig. 21B); integument of legs blackish (Mexico) *Mesoplia dugesi* (Cockerell, 1917)
 - Setae of most of the body mainly whitish; metallic scales on the tegula absent (Fig. 24B); integument of legs reddish brown (Mexico to South America) *Mesoplia rufipes* (Perty, 1833)
 - 4(2). Mesosomal pubescence mainly bright yellow 5
 - Pubescence of the mesosoma mainly blackish and whitish, if it presents yellowish setae they are restricted to the posterior region of the scutellum 6
 - 5(4). Pubescence of the mesosoma almost exclusively bright yellow; central disc of scutum and dorsal surface of scutellar tubercles with yellow setae; metasoma with a spot of bright yellow pubescence on lateral margins of T1 and T2 (repeated in some specimens until T4) (Fig. 6A); T7 concavity shallow; T7 apices broadly rounded (Fig. 7A) (México) *Mesoplia insignis* (Smith, 1879)
 - Pubescence of the mesosoma bright yellow interrupted by a broad transverse band in the anterior region; central disc of scutum and dorsal surface of scutellar tubercles with scattered black setae; metasoma with a bright yellow pubescent spot on both lateral margins of T1 (some specimens also with a very small spot on T2) (Fig. 11A); T7 concavity deep; T7 apices narrowly rounded (Fig. 7B) (Costa Rica) *Mesoplia tica* sp. nov.
 - 6(4). T7 with apices rounded and setae on ventral side come out a little in dorsal view (Fig. 7C) (Mexico and Central America) *Mesoplia sapphirina* Melo & Rocha-Filho, 2011
 - T7 with apices flat and with ventral setae below conspicuous in dorsal view (Panama and South America) *Mesoplia regalis* (Smith, 1854)
 - 7(1). Pubescence of the head and mesosoma mainly bright yellow; metasoma with spots of pubescence bright yellow on lateral margins of T1 and T2 (Fig. 32A, B); without spots of short white pubescence on the marginal areas of T3 to T6; middle tibial spur with long branches (Fig. 16E) (South of Mexico, Chiapas, to South America) *Mesoplia ornata* (Spinola, 1841)
 - Pubescence of the head and mesosoma mainly whitish; without yellow pubescence on the metasoma; with 2 spots of short white pubescence in the marginal zone of T2 to T6 (Fig. 29D); branches of the middle tibial spur short (Fig. 16D) (Mexico, Guatemala and Costa Rica) *Mesoplia carmelitae* sp. nov.
- Females
1. Pygidial plate broad, occupying the exposed dorsal surface of T6 and covered with scales or setae (Fig. 4A-G); dorsal surface of posterior coxa angulate or carinate at the junction with the lateral surfaces [*M. (Mesoplia)*] 2
 - Pygidial plate narrow, does not completely occupy the exposed dorsal surface of T6 and without scales or setae (Figs. 4H, 23D); dorsal surface of posterior coxa abruptly rounded at the junction with lateral surfaces [*M. (Eumelissa)*] 9
 - 2(1). Pronotum with a carina extending laterally from the pronotal collar to the pronotal lobe (Fig. 5B) (Group *azurea*) 3
 - Pronotum without a carina extending laterally from the pronotal collar to the pronotal lobe (Fig. 5A) 5
 - 3(2). With metallic scales evident on head and tegula (Mexico) (Fig. 23B) *Mesoplia dugesi* (Cockerell, 1917)
 - Without metallic scales or inconspicuous on head and tegula 4
 - 4(3). Setae on most of the body mainly dark; pygidial plate with broad apex (Fig. 4G) (Mexico, Oaxaca) *Mesoplia oaxacana* sp. nov.

- Setae of most of the body mainly whitish; pygidial plate with narrow apex (Fig. 4F) (Mexico to South America).....
.....*Mesoplia rufipes* (Perty, 1833)
- 5(2). With bright yellow pubescence on head, mesosoma and metasoma (Fig. 20) (Mexico, Veracruz)
.....*Mesoplia veracruzana* sp. nov.
- Without bright yellow pubescence on head, mesosoma and metasoma 6
- 6(5). With metallic scales very evident on the scape and tegula; forewings evenly smoked..... 7
- Without metallic scales on the scape and tegula or not very evident; forewings with a darker spot at the apex 8
- 7(6). Head pubescence mainly black (Fig. 9C); scutellar tubercles moderately projecting upwards (Fig. 9D); truncated pygidial plate with dark setae on the surface (Fig. 4A) (Mexico)..... *Mesoplia insignis* (Smith, 1879)
- Head pubescence mainly whitish (Fig. 13C); scutellar tubercles strongly projecting upwards (Fig. 13A); rounded pygidial plate with scales on the surface, in some specimens they do not reach the apex due to the abrasion of these (Fig. 4B) (Costa Rica)..... *Mesoplia tica* sp. nov.
- 8(6). Poorly developed scutellum protuberances with a shallow depression between them and low tubercles (Fig. 16A, D); the carina of the scutellum runs continuously from one side to the other (Mexico and Central America).....
.....*Mesoplia sapphirina* Melo & Rocha-Filho, 2011
- Scutellum protuberances developed with a deep depression between them and conspicuously pointed tubercles; the carina of scutellum most developed along tubercles, gradually fading to sides (Panamá and South America).....
.....*Mesoplia regalis* (Smith, 1854)
- 9(1). With pale yellow pubescence on the mesosoma (Fig. 34A-C); T2 to T5 without white pubescent spots; long middle tibial spur branches (South of Mexico, Chiapas, to South America).....*Mesoplia ornata* (Spinola, 1841)
- Without pale yellow pubescence on the mesosoma; T2 to T5 with a couple of spots of appressed white pubescence in the marginal zone (Fig. 31A); short middle tibial spur branches (Fig. 18D) (Mexico, Guatemala and Costa Rica).....
.....*Mesoplia carmelitae* sp. nov.

Hosts. Like the rest of the members of the Ericrocridini tribe, species of the genus *Mesoplia* are cleptoparasites of several species of the Centridini tribe (Table 2). It should be noted that *M. rufipes* is the only species of the tribe that has been recorded cleptoparasitizing species of *Epicharis*. The cleptoparasitism relationship between *M. insignis* and *Centris agilis* was recorded for the first time in Jalisco, Mexico. The first author of this work had the opportunity to collect some specimens of this species in an aggregation of *C. agilis* nests in a suburban site.

Floral asossitations. The floral records reported in this section are based on information extracted directly from the collection tags of the specimens reviewed in this study (Table 3).

Discussion

The complexity of the genus *Mesoplia* has previously been recognized for regions like the Caribbean. There is inaccurate information on its distribution due to taxonomic problems, which has caused erroneous identifications (Genaro & Breto, 2022; Genaro & Franz, 2008). For Mexico, difficulty in accessing the primary types deposited in institutions outside the country complicates the taxonomic understanding of the group. However, there are quality images available that have allowed this review, obtaining a reliable list and synonymizing the names that

were required v. gr. *M. insignis* (Smith, 1879) and *M. imperatrix* (Friese, 1912), a species easily recognizable in the end.

Most of the of the species in this study present morphological characters that make them easily differentiated. However, 2 pairs of species, *M. regalis* and *M. sapphirina*; as well as *M. dugesi* and *M. oaxacana*, are quite similar to each other, particularly the females, which complicates their differentiation. Here we provide characters that allow the unequivocal identification of the mentioned species, such as scutellar tubercles and pygidial plate. Additionally, variation in characters of the male of *M. rufipes*, including shape of S8 and shape of the basal projection of the posterior femur, hint to the possibility that *M. rufipes* is a species complex, but more evidence is needed including molecular studies.

The association of cleptoparasitism between *M. insignis* and *Centris agilis* supports the observations of Lim et al. (2022), they observed a considerable increase in the body size of Ericocridini that could be influenced by a change of host; and supports Harrison's rule, since both species are of similar sizes (Harrison, 1915). Therefore, in some cases where the host is unknown, it could at least be inferred. For example, *M. carmelitae* sp. nov. is a relatively small bee within the genus, so it is expected that its host will be a bee from the Centridini tribe of similar size (approx. 11.395 mm) and distributed in the

Table 3

Floral records of the species of *Mesoplia* Lepeletier, 1841.

Species	Plant	Family
<i>Mesoplia</i> (M.) <i>dugesii</i> (Cockerell, 1917)	<i>Tecoma stans</i>	Bignoniaceae
	<i>Canavalia villosa</i>	Fabaceae
	<i>Crotalaria</i> sp.	
	<i>Libidibia sclerocarpa</i>	
<i>Mesoplia</i> (M.) <i>insignis</i> (Smith, 1879)	<i>Macropodium atropurpureum</i>	
	<i>Eryngium</i> sp.	Apiaceae
	<i>Macropodium atropurpureum</i>	Fabaceae
	<i>Ramirezella</i> sp.	
	<i>Vitex pyramidata</i>	Lamiaceae
	<i>Cuphea lanceolata</i>	Lythraceae
	<i>Hibiscus tiliaceus</i>	Malvaceae
	<i>Antigonon leptopus</i>	Polygonaceae
<i>Mesoplia</i> (M.) <i>regalis</i> (Smith, 1854)		
<i>Mesoplia</i> (M.) <i>rufipes</i> (Perty, 1833)	<i>Ipomoea violacea</i>	Convolvulaceae
	<i>Tabebuia rosea</i>	Bignoniaceae
	<i>Tecoma stans</i>	
	<i>Caesalpinia</i> sp.	Fabaceae
	<i>Haematoxylon brasiletto</i>	
	<i>Hyptis albida</i>	Lamiaceae
	<i>Cuphea</i> sp.	Lythraceae
	<i>Genipa americana</i>	Rubiaceae

same geographical area. There is an opportunity to study cleptoparasite-host relationships between bees of the tribe Centridini and Ericrocidini, in sites where it is known that nest aggregations periodically occur, in addition to increasing information about the immature stages of both groups.

With this research, the region studied reaches South America with 10 species of *Mesoplia*, despite this it is expected that there are still several species to be described for that region since Ericrocidini is richer in that region (Snelling & Brooks, 1985). Furthermore, the distribution of some of the species recognized in this work could be broader, since there is a significant information gap across some Central American countries. The area

included in this study has little diversity of species of the subgenus *Eumelissa*, with only 2 of the 10 known species. Furthermore, the data obtained extends the distribution of *Eumelissa* at least to Central Mexico on the Pacific Slope (particularly in Jalisco), far north of the previous northern limit in Costa Rica (Snelling & Brooks, 1985).

Acknowledgements

This article serves as fulfillment of the first author for obtaining the degree of M.Sc. degree with emphasis on Systematics of the Posgrado en Ciencias Biológicas at the UNAM. This study was financially supported by the student grants: Beca Nacional para Estudios de Posgrado 2022 - 1 Conahcyt No. 814906 and Programa de Apoyo a los Estudios de Posgrado (PAEP) 2023. We want to thank José Luis Navarrete (CZUG), Hugo Fierros (CZUG and HFL), Jorge E. Valenzuela, Viridiana Vega, Gerardo Quintos-Andrade (IEXA), Rémy Vandame, Jorge A. Mérida Rivas, Philippe Sagot (ECOAB), Virginia Meléndez Ramírez, María José López Gómez (CER-UADY), Zachary Falin, Michael Engel, Rachel Osborn (SEMC), Maricelle Méndez, Marcela Sánchez (MNCR), Mauricio Fernández, Paul Hanson (MZUCR), Mario Gallardo, Eduardo Herrera (CINAT) for the loan of specimens and/or for the information provided about the specimens of *Mesoplia* deposited in their collections. We thank Stefanie Krause (ZMB) and Corey Smith (AMNH), who sent us photographs of some type specimens. We thank again Jorge Mérida (ECOAB), Marcela Sánchez (MNCR), José Luis Navarrete (CZUG), Adam Karremans (Director of Jardín Botánico Lancaster, UCR) and Nicolás Rengifo Alfonso (MZUCR) for letting and helping us to use the imaging system to take the photographs. We want to thank Daniel Garrigues, Gerardo Quintos-Andrade, Belem Hernández and “Homúnculo Daimon” for the photographs of *Mesoplia* in nature. Finally, we thank the reviewers that helped to improve this article.

References

- Aguiar, A. M. L., & Ganglianone, M. C. (2003). Nesting biology of *Centris (Centris) aenea* Lepeletier (Hymenoptera, Apidae, Centridini). *Revista Brasileira de Zoologia*, 20, 601–606. <https://doi.org/10.1590/S0101-81752003000400006>
- Coville, R. E., Frenkie, G. W., & Vinson, S. B. (1983). Nests of *Centris segregata* (Hymenoptera: Anthophoridae) with a Review of the Nesting Habits of the Genus. *Journal of the Kansas Entomological Society*, 56, 109–122.
- Gaglianone, M. C. (2005). Nesting biology, seasonality, and flower hosts of *Epicharis nigrita* (Friese, 1900) (Hymenoptera: Apidae: Centridini), with a comparative analysis for the

- genus. *Studies on Neotropical Fauna and Environment*, 40, 191–200. <https://doi.org/10.1080/01650520500250145>
- Genaro, J. A., & Franz, N. M. (2008). The bees of Greater Puerto Rico (Hymenoptera: Apidae: Anthophila). *Insecta Mundi*, 40, 1–24.
- Genaro, J. A., & Breto, D. (2022). Descripción de dos especies nuevas de *Mesoplia* Lepeletier (Hymenoptera: Apoidea: Apidae) para Cuba y Las Bahamas, con notas sobre taxonomía y distribución del género en las Antillas. *Insecta Mundi*, 929, 1–17.
- Harris, R. A. (1979). A glossary of surface sculpturing. *Occasional Papers in Entomology*, 28, 1–32.
- Harrison, L. (1915). Mallophaga from *Apteryx*, and their significance; with a note on the genus *Rallicola*. *Parasitology*, 8, 88–100.
- Hiller, B., & Wittmann, D. (1994). Seasonality, nesting biology and mating behavior of the oil-collecting bee *Epicharis dejeanii* (Anthophoridae, Centridini). *Biociências*, 2, 107–124.
- Lim, K., Lee, S., Orr, M., & Lee, S. (2022). Harrison's rule corroborated for the body size of cleptoparasitic cuckoo bees (Hymenoptera: Apidae: Nomadinae) and their hosts. *Scientific Reports*, 12, 10984. <https://doi.org/10.1038/s41598-022-14938-9>
- Lobo, J. A., Fernández-Otárola, M., Chavarría, M. M., & Agraz-Hernández, C. M. (2023). Nesting biology of *Centris aethyctera* (Centridini, Apidae) in an estuarine environment. *Apidologie*, 54, 58. <https://doi.org/10.1007/s13592-023-01044-6>
- Martins, A. C., Luz, D. R., & Melo, G. A. R. (2018). Palaeocene origin of the Neotropical lineage of cleptoparasitic bees Ericrocini-Rhathymini (Hymenoptera, Apidae). *Systematic Entomology*, 43, 510–521. <https://doi.org/10.1111/syen.12286>
- Martins, C. F., Neto V. I. S., & Cruz, R. D. M. (2019). Nesting biology and mating behavior of the solitary bee *Epicharis nigrita* (Apoidea: Centridini). *Journal of Apicultural Research*, 58, 1–11. <https://doi.org/10.1080/00218839.2019.1584963>
- Martins, C. F., Peixoto, M. P., & Aguiar, C. M. L. (2014). Plastic nesting behavior of *Centris* (*Centris*) *flavifrons* (Hymenoptera: Apidae: Centridini) in an urban area. *Apidologie*, 45, 156–171. <https://doi.org/10.1007/s13592-013-0235-4>
- Michener, C. D. (2007). *The bees of the World (2nd Edition)*. Baltimore, Maryland: The Johns Hopkins University Press.
- Moure, J. S. (1960a). Notas sobre os tipos de abelhas do Brasil descritas por Perty em 1833 (Hymenoptera - Apoidea). *Boletim da Universidade do Paraná, Zoologia*, 1, 1–23.
- Moure, J. S. (1960b). Notes on the types of the Neotropical bees described by Fabricius (Hymenoptera: Apoidea). *Studia Entomologica*, 3, 97–160.
- Moure, J. S., & Melo, G. A. R. (2023). *Mesoplia* Lepeletier, 1841. In J. S. Moure, D. Urban, & G. A. R. Melo (Orgs.), *Catalogue of bees (Hymenoptera, Apoidea) in the Neotropical Region*. Retrieved on 30 May 2024 from: <http://moure.cria.org.br/catalogue?id=113174>
- QGIS.org (2022). QGIS Geographic Information System. QGIS Association. <http://www.qgis.org>
- Rocha-Filho, L. C., Morato, É. F., & Melo, G. A. R. (2009). New host records of *Aglaomelissa duckei* and a compilation of host associations of ericrocini bees (hymenoptera: Apidae). *Zoologia*, 26, 299–304. <http://dx.doi.org/10.1590/S1984-46702009000200012>
- Rocha-Filho, L. C., Silva, C. I., Gaglianone, M. C., & Augusto, S. C. (2008). Nesting behavior and natural enemies of *Epicharis* (*Epicharis*) *bicolor* Smith (Hymenoptera: Apidae). *Tropical Zoology*, 21, 227–242.
- Rozen, J. G. (1969). The larvae of the Anthophoridae (Hymenoptera, Apoidea). Part 3. The Melectini, Ericrocini, and Rhathymini. *American Museum Novitates*, 2382, 1–24.
- Rozen, J. G. (2016). Nesting biology of the solitary bee *Epicharis albofasciata* (Apoidea: Apidae: Centridini). *American Museum Novitates*, 3869, 1–8. <https://doi.org/10.1206/3869.1>
- Rozen, J. G., Vinson, S. B., Coville, R. E., & Frankie, G. W. (2011). Biology of the cleptoparasitic bee *Mesoplia sapphirina* (Ericrocini) and its host *Centris flavofasciata* (Centridini) (Apidae: Apinae). *American Museum Novitates*, 3723, 1–36. <https://doi.org/10.1206/3723.2>
- Silveira, F. A., Melo, G. A. R., & Almeida, E. A. B. (2002). *Abelhas brasileiras: sistemática e identificação*. Belo Horizonte, Minas Gerais: Ministério do Meio Ambiente & Fundação Araucária.
- Snelling, R. R. (1984). Studies on the taxonomy and distribution of American Centridine bees (Hymenoptera: Anthophoridae). *Contributions in Science, Natural History Museum of Los Angeles County*, 347, 1–69.
- Snelling, R. R., & Brooks, R. W. (1985). A review of the genera of cleptoparasitic bees of the Tribe Ericrocini (Hymenoptera: Anthophoridae). *Contributions in Science, Natural History Museum of Los Angeles County*, 369, 1–34.
- Vinson, S. B., Frankie, G. W., & Coville, R. E. (1987). Nesting habits of *Centris flavofasciata* Friese (Hymenoptera: Apoidea: Anthophoridae) in Costa Rica. *Journal of the Kansas Entomological Society*, 60, 249–263.
- Vivallo, F. (2010). *Sistemática e filogenia da tribo de abelhas Centridini e suas relações filogenéticas com as tribos cleptoparasitas Ericrocini e Rhathymini (Hymenoptera: Apidae) (Ph.D. Thesis)*. Universidade Federal do Paraná. Curitiba, Brazil.
- Vivallo, F. (2014). Taxonomic revision of the cleptoparasitic bee genus *Epiclopus* Spinola, 1851 (Hymenoptera: Apidae: Ericrocini). *Zootaxa*, 3857, 41–70. <https://doi.org/10.11646/zootaxa.3857.1.2>
- Vivallo, F. (2021). Nesting behavior of the oil-collecting bee *Epicharis* (*Triepicharis*) *analis* Lepeletier (Hymenoptera: Apidae) in an urban area of Rio de Janeiro, RJ, Brazil. *Journal of Apicultural Research*, 60, 135–142. <https://doi.org/10.1080/00218839.2020.1820150>
- Werneck, H. A., & Campos, L. A. O. (2020). A study of the biology of *Epicharis* (*Epicharoides*) *picta* using emergence-traps. *Journal of Hymenoptera Research*, 80, 147–167. <https://doi.org/10.3897/jhr.80.56898>