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Silvorientilla, gen. nov. A NEW NEOTROPICAL VELVET ANT GENUS (HYMENOPTERA: MUTILLIDAE)

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***Silvorientilla*, gen. nov. A NEW NEOTROPICAL VELVET ANT GENUS
(HYMENOPTERA: MUTILLIDAE)**

***Silvorientilla*, gen. nov. Un género nuevo Neotropical de hormiga
terciopelo (Hymenoptera: Mutillidae)**

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ABSTRACT. The new genus *Silvorientilla* is described to include the following seven Neotropical species: *Silvorientilla separata* (Smith), 1879, **comb. nov.**; *S. bonus* Williams and Cambra, **sp. nov.**, *S. dasylymatos* Williams and Cambra, **sp. nov.**, *S. incondinatus* Williams and Cambra, **sp. nov.**, *S. philobeddoe* Williams and Cambra, **sp. nov.**, *S. proसारसोर* Williams and Cambra, **sp. nov.**, and *S. sinenomine* Williams and Cambra, **sp. nov.**

Key words: Taxonomy, new genus, new species, Sphaerophthalminae, parasitoid, Clint Eastwood.

RESUMEN. El género es descrito para incluir las siguientes siete especies neotropicales: *Silvorientilla separata* (Smith), 1879, **comb. nov.**; *S. bonus*, **sp. nov.**, *S. dasylymatos*, **sp. nov.**, *S. incondinatus*, **sp. nov.**, *S. philobeddoe*, **sp. nov.**, *S. proसारसोर*, **sp. nov.**, and *S. sinenomine*, **sp. nov.**

Palabras clave: Taxonomía, Sphaerophthalminae, parasitoide, Clint Eastwood.

INTRODUCTION

More species of Mutillidae have been recorded from the Neotropical region than any other ecozone (Lelej, 2005). In the most recent catalog of Neotropical mutillids (Nonveiller, 1990), 147 species were treated as “*incertae sedis*”, because they had not been reliably placed into any of the established genera. In recent studies, many of these species were successfully transferred into previously established genera, like *Dasymutilla* Ashmead, 1899 (Manley and Pitts, 2007; Luz *et al.*, 2016) or they formed the basis for new genera, like *Frigitilla* Williams in Bartholomay *et al.*, 2015 (Bartholomay *et al.*, 2015; Cambra *et al.*, 2016).

Mutilla separata Smith, 1879 (Figs. 1-2) is an *incertae sedis* species that shares morphological similarities with *Lophomutilla* Mickel, 1952, *Lophostigma* Mickel, 1952, and *Pseudomethoca* Ashmead, 1899, but cannot be reliably placed into either genus. Five additional morphospecies of females that share traits with *M. separata*

were studied and males were associated with three of these. Additionally, one unassociated male was also discovered. In addition to having a unique combination of various traits shared with the genera listed above, these seven species also present synapomorphies that are unique in the Neotropical fauna, particularly of the male genitalia. Here we propose the new genus *Silvorientilla* to house these species.

MATERIALS AND METHODS

The following codens are used for material discussed in this study.

BMNH. The Natural History Museum, London, United Kingdom.

CSCA. California State Collection of Arthropods, Sacramento, California, USA.

CUIC. Cornell University Insect Collection, Department of Entomology, Cornell University, Ithaca, New York, USA.

EMUS. Department of Biology Insect Collection, Utah State University, Logan, Utah, USA.

MIUP. Museo de Invertebrados G.B. Fairchild, Universidad de Panamá.

Specimens were examined with various stereomicroscopes in multiple labs. Most habitus photographs were taken using a Leica MC170 HD camera through a Leica M165C stereomicroscope and lit using a ring light under an opaque dome. Comparative measurements were made from these photographs. Distributions for each species are supplemented with their placement in the World Wildlife Foundation's Terrestrial Ecoregions (Olson *et al.*, 2001) using the Terrestrial Ecoregions plugin for Google Earth available here: https://worldmap.harvard.edu/data/geonode:wwf_terr_ecos_oRn.

We use the term “simple setae” for setae that are smooth and do not have barbed surfaces. “Brachyplumose setae” refers to setae with barbs that are less than or equal to the diameter of the shaft at the attachment of the barb. We use the abbreviations T2, T3, etc., to denote the second, third, etc., metasomal terga while S2, S3, etc., denote the second, third, etc., metasomal sterna and F2, F3, etc., denote the antennal flagellomeres. DLO is an abbreviation for the diameter of a lateral ocellus. OOD is an abbreviation for ocellular distance, the minimal distance between a lateral ocellus and the inner eye margin. IOD is an abbreviation for inter-ocellar distance, the minimal distance between a lateral ocellus and the median ocellus. The head width was measured directly behind the eyes in dorsal view; the pronotum width was measured between the outside edges of the pronotal spiracles; the mesosoma width was measured between the medial lateral mesonotal teeth; and the mesosoma length was measured between the anteromedial pronotal margin (excluding the anterior collar) and the beginning of the posterior propodeal face; the T2 length and width are the maximum possible measures of those traits in dorsal view. The down-curving angle of the penis valve is measured between the horizontal ventral surface and the dorsal apical tooth (Figs. 22, 28).

DESCRIPTION

Genus *Silvorientilla*
Williams and Cambra, gen. nov.

Type species. *Mutilla separata* Smith, 1879
<http://zoobank.org/18BB3DC4-7613-4DA9-AD46-9183BD28AACA>

Diagnosis. Female. Females of *Silvorientilla* can be recognized by the following combination of characters: the mandible is dilated and obliquely tridentate apically; F1 is at least 2 × longer than F2; the genal and hypostomal carinae are distinct, but simple; the clypeus is deeply emarginate ventromedially; the mesosoma is constricted at the propodeal spiracles; T1 is disciform, with a medial spine; the disc of T2 has two laterally situated yellowish cuticular spots in the posterior half; and T6 lacks a defined pygidium. **Male.** Males of *Silvorientilla* have the following combination of characters: the mandible is broad and suddenly narrowed before the acute apex, the pre-narrowed inner margin is evenly rounded; the clypeus is densely punctate and anteriorly protruding to bidentate or angular truncate apex; the head is dorsoventrally flattened; the epaulets, mesopleuron and axillae are unarmed; the metapleuron and lateral propodeal face are densely setose; T1 is elongate subsessile with T2; the fringes of T2-4 are composed of simple setae; the hypopygium is truncate; the paramere has a subapical ventral protrusion; and the penis valve is elongate with a down-curving bidentate apex and a small lobe near the dorsal tooth.

Description. Female. With two sub-circular cuticular yellowish spots on T2 disc in posterior half. **Head.** Transverse, punctate, mostly clothed with simple decumbent setae and scattered brachyplumose erect setae. Occipital carina usually distinct. Eye subcircular, protruding, ommatidia distinct. Antennal tubercles unarmed, basally separated. Antennal scrobe unbounded laterally, with dorsal carina. Clypeus densely setose and punctate with medial subtriangular raised area, ventral margin emarginate medially and dentate sublaterally. Malar space slightly shorter than F1. Genal carina distinct, extending from near hypostomal carina to posterolateral angle of head. Hypostomal carina distinct, simple. Proboscidal and mandibular fossae separated by complete bridge, proboscidal fossa about as long as ventral surface of head. Scape simple, punctate above. Pedicel slightly longer

than wide, shorter than first flagellomere; first flagellomere much longer than wide, at least twice as long as second. Mandible medially constricted, weakly dilated subapically, obliquely tridentate apically, unarmed ventrally. Maxillary palp 6-segmented; labial palp 4-segmented. **Mesosoma.** Longer than wide with pronotal sides sub-parallel, mesonotum broadly expanded with lateral tooth, then narrowed to propodeal spiracle, propodeum broadened posteriorly. Dorsum, propleuron, and posterior propodeal face densely reticulate, clothed with simple decumbent setae and with a few scattered brachyplumose erect setae. Pronotal dorsal face (excluding anterior collar/flange) with anterior margin slightly convex, weakly carinate, epaulet inconspicuous, humeral angle acutely protruding and vertically carinate; anterior face micropunctate and setose; collar with transverse punctures or ridges. Scutellar scale absent. Pronotal-mesopleural suture and meso-metapleural suture each distinct and reduced to apparent carina. Mesopleuron finely punctate except with distinct puncture row posteriorly, clothed with fine decumbent setae. Metapleural-propodeal suture obscure, obliterated dorsal to endophragmal pit. Metapleuron and lateral face of propodeum, micropunctate and densely setose throughout. Metasternal process triangular, unidentate acute apically, almost as long as metacoxal height. **Legs.** Tibial spur formula 1-2-2. Foreleg without tarsal comb. Mid- and hind tibiae each with single row of three prominent spines, apical spines not inserted on any process; apical spurs narrow, finely and shallowly pectinate. Metacoxa with strong even longitudinal carina on inner margin. **Metasoma.** Clothed with appressed simple setae and erect simple and brachyplumose setae. T1 wider than long, $\sim 0.5 \times$ width of T2, sub-disciform to distinctly disciform; anterior auricle generally prominent. T2 lateral felt line distinct, $\sim 0.3 \times$ T2 length laterally. T6 without any trace of pygidial area. S1 with or without median carina. S2 without felt line.

Male. Without defined pubescent or integumental spots. **Head.** Dorso-ventrally flattened, broadly rounded posteriorly, about as wide as mesosoma; surface shiny, dorsal and

lateral surfaces densely punctate, clothed with simple decumbent and erect setae, ventral surface smooth and impunctate. Occipital carina distinct dorsally. Vertex evenly convex behind ocelli. Eye subcircular, protruding, ommatidia distinct. Ocelli small. Antennal tubercles mostly smooth. Antennal scrobe broadly concave, with weak tubercle above. Clypeus densely punctate and anteriorly protruding to bidentate or sharply angular truncate apex. Malar space shorter than basal height of mandible. Gena ecarinate. Hypostomal carina distinct but weak, even, following margin of oral fossa, ending laterally near inner margin of mandible, not reaching posterior mandibular condyle. Proboscidal and mandibular fossae separated by obscure bridge. Scape unicarinate below, carina lamelliform basally and obliterated apically. Pedicel as wide as long, shorter than first flagellomere, which is longer than second flagellomere. Mandible dilated and obliquely tridentate apically, inner tooth broadly rounded; unarmed ventrally. Maxillary palp 6-segmented; labial palp 4-segmented. Mentum basically flat with longitudinal medial carina. **Mesosoma.** Dorsal surface shiny between punctures, lateral surface predominantly micropunctate and microsetose, mesosoma densely punctate except without large punctures on anterior face of pronotum, metapleuron and lateral face of propodeum anteriorly, remainder of propodeum reticulate; clothed with simple, brachyplumose, and narrowly lanceolate decumbent and erect setae. Pronotal dorsal face (excluding anterior collar/flange) with anterior margin slightly convex, rounded, epaulet scarcely evident, humeral angle rounded. Posterodorsal margin of pronotum broadly concave, sigmoidal on each side. Tegula subcircular, evenly convex, mostly smooth. Mesoscutum with notaulus obliterated, parapsis distinct and extending forward past mid-point of tegula; posterolateral corner forming a slight raised angular lobe. Mesoscutellum scarcely convex. Axilla flat, punctate throughout. Metanotum simple, transverse. Propodeum convex, disk and declivity evenly rounded into one another. Metasternal process unidentate, apex rounded. **Wings.** Forewing with ovate sclerotized pterostigma; marginal cell longer than stigma, rounded acute apically; two closed submarginal

cells. **Legs.** Tibial spur formula 1-2-2. Mid- and hind tibiae with several strong slender semi-erect macrosetae dorsally and one weak apical spine not inserted on any process; apical spurs densely covered with microsetae. Meta-coxa with weak longitudinal carina on inner/posterior margin. **Metasoma.** T1 longer than wide, ~ 0.5 × width of T2, gradually broadened posterad, subsessile apically in dorsal view, punctate with simple erect setae; anterior auricle weak, forming obscure rounded vertical flattened lobe. T2 disc punctate, with simple erect setae and swollen, fringe area distinctly constricted with denser setae than disc; felt line fairly narrow and long. T3-6 punctate, with simple erect and narrowly lanceolate decumbent setae. T7 punctate with simple narrowly lanceolate erect setae basally, apicomediaally smooth and impunctate, posterior margin obscurely upcurved. Sterna punctate with simple erect to decumbent setae. S1 with weak longitudinal carina. S2 simple, evenly convex, without felt line. S7 concealed. Hypopygium flat, apex truncate or with shallow median emargination. **Genitalia.** Paramere elongate, obliquely dorsoventrally flattened, apically slender digitiform, with swollen densely setose lobe on inner face near mid-length. Parapenial lobe well developed, acute. Volsella with cuspis and digitus short; cuspis pad-like, setose apicolaterally; digitus finger-like, asetose. Penis valve practically asetose, bidentate apicoventrally, broadly downcurved apically.

Included species. Seven species: *Silvorientilla separata* (Smith), 1879, **comb. nov.**, *S. bonus*, **sp. nov.**, *S. dasylymatos*, **sp. nov.**, *S. incondinatus*, **sp. nov.**, *S. philobeddoe*, **sp. nov.**, *S. proasarasoror*, **sp. nov.**, and *S. sinenomine*, **sp. nov.**

Distribution. This genus ranges from the Veracruz, Mexico to Coclé, Panama.

Etymology. From the Latin *silva*, forest, and *orient*, east, with a common suffix for mutillid genera. Jointly named for the tropical forests of eastern Mexico, where the type occurs, and in honor of film actor and director Clint Eastwood. Gender feminine.

Remarks. Mickel included the genotype, *S. separata*, **comb. nov.**, in an unpublished key to Neotropical *Pseudomethoca*, ostensibly because the mesosoma is constricted at the propodeal

spiracles. In his unpublished thesis, Cambra (1996) treated *S. separata* as a member of the genus *Lophomutilla*, because of the undefined pygidium and dilated mandible. The species here also resemble *Lophostigma* because of their undefined pygidium and disciform T1. Therefore, these females have a unique combination of characters among the New World mutillid fauna, specifically in the constricted mesosoma, dilated mandible, disciform T1 with medial spine, and undefined pygidium. Additionally, the male's ventral setose paramere lobe and evenly downcurved narrowly bidentate penis valve with a dorsal lobe are apparent autapomorphies for this genus.

***Silvorientilla separata* (Smith, 1879) comb. nov.**

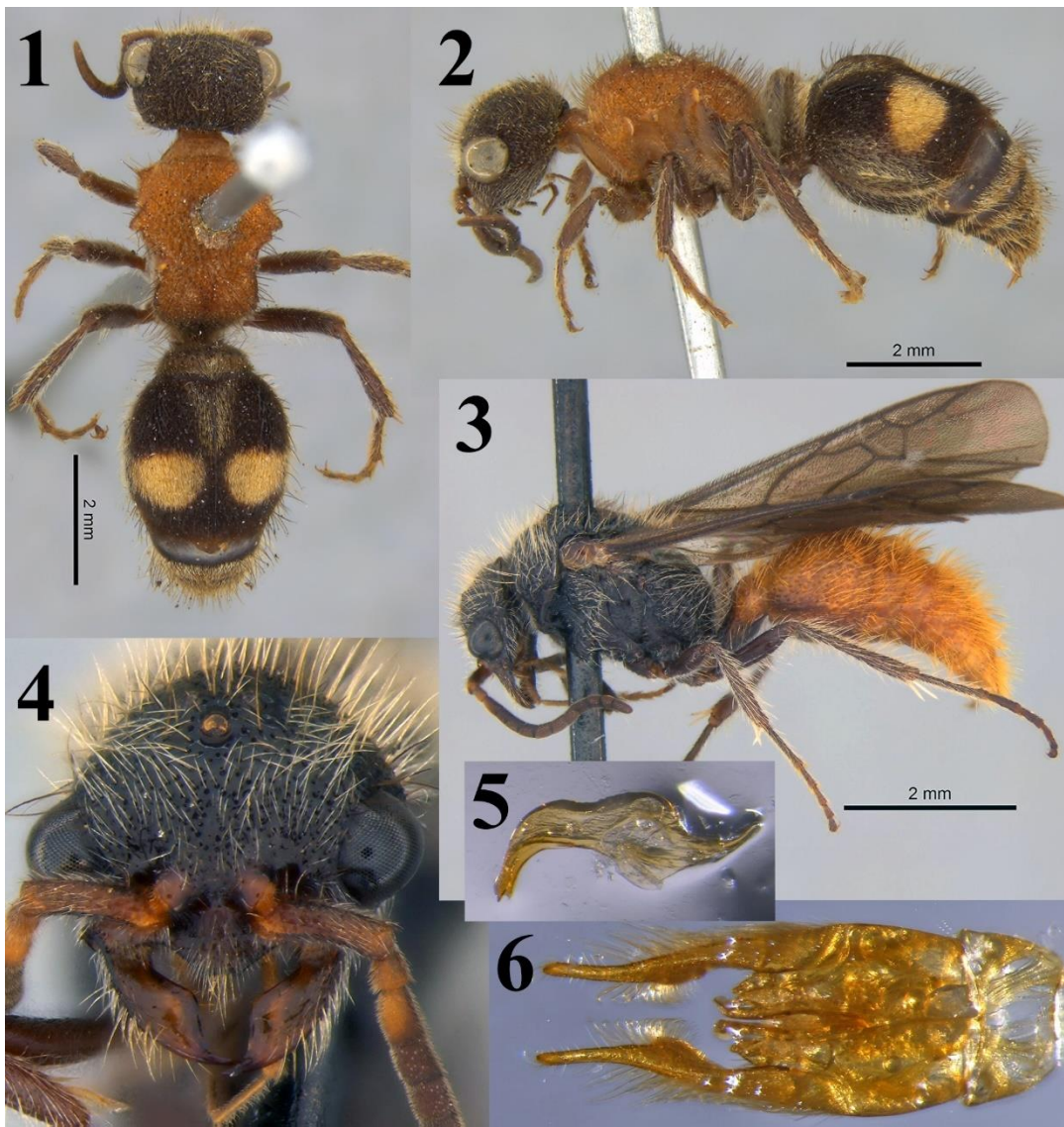
(Figs. 1-2)

Mutilla separata Smith, 1879: 227. **comb. nov.**

Ephuta separata (Smith), in André 1902: 63.

Diagnosis of female. This species is unique in having the longitudinal lamellate carina of T2 extending from the base to near apex of T2. The following characters may also aid in diagnosis: the mesosoma is predominantly orange-brown; the ventrolateral clypeal process is unidentate; the T2 setae are black between the yellow cuticular spots; T2 is swollen basolaterally with numerous distinct longitudinal carinae; and T3 is covered entirely with silvery setae. Body length: 6-9 mm.

Redescription of type female. Coloration. Head brown-black, except mandible and scape orange-brown. Mesosoma orange-brown except mesopleuron ventrally, lateral propodeal face, and posterior propodeal face ventrally dark brown. Legs mostly dark brown, femoral bases lighter. Metasoma brown-black, except T2 with two large transverse ovate yellow cuticular spots in posterior half. Head setae silvery, few erect brown setae on vertex. Mesosoma with sparse short silvery setae except mesonotum with sparse yellow orange setae, mesosomal dorsum with scattered erect brown setae. T1 and T3-6 setae entirely silvery; T2 setae silvery laterally, basomedially, and on yellow spots, remaining setae black, including entire T2 fringe. Tibial spurs white. **Head.** Head width subequal to pronotal width. Front, vertex and gena punctation



Figures 1-6. *Silvorientilla*. (1-2) *S. separata* (Smith, 1879), female. (3-6) *S. proसारoror*, **sp. nov.**, male. (1) Habitus, dorsal view. (2, 3) Habitus, lateral view. (4) Male anterior surface of head. (5) Male penis valve, lateral view. (6) Male genitalia, dorsal view.

dense to tight reticulate, many interspaces reduced to carinae. Clypeus punctate and setose throughout, anterior margin deeply emarginate medially, appearing bidentate. Genal carina distinct, but not reaching hypostomal carina. Mandible oblique, slightly dilating, tridentate with inner tooth forming obtuse angle, ventral margin shallowly sinuate. Antennal scrobe with weak dorsal carina. Length of F1 $2.5 \times$ pedicel; F2 $1.1 \times$ pedicel length. **Mesosoma.** Mesosomal length subequal to width. Humeral carina angulates dorsally, weakly continuing to epaulet. Mesosomal dorsum reticulate, medially with many interspaces obliterated, leaving apparent

striae. Lateral propodeal face with scattered punctures. **Metasoma.** T1 disciform, medial tooth length subequal to dorsal face, margin between dorsal and anterior faces interrupted by some punctures. T2 length subequal to width. Disc of T2 densely reticulate and densely setose; medially with distinct longitudinal lamelliform carina from base nearly to apex, swollen and with distinct striae basolaterally. T3-5 and S2-5 with densely punctate and densely setose. T6 convex, densely punctate, interspaces mostly smooth, apical portion smooth.

Male. Unknown.

Material examined. MEXICO, Veracruz: 56/143

[Orizaba] (1♀, B.M. Type Hym. 15-801, BMNH); Río Metlac Cn., 4 km S Fortín, 17.VII.1990, 900 m, J. K. Liebherr, CAS-CU-UCB Field Exp. (1♀, det. KAW, CUIC).

Distribution. The only specimens available were collected in the Petén-Veracruz moist forest ecoregion on the eastern slopes of the southern Sierra Madre Oriental.

Remarks. Cambra (1996) listed 18 specimens ranging from Veracruz, Mexico southeast to Coclé, Panama. The southern color variants discussed in his initial treatment are considered full species in this study, because they are separated geographically and have various minor structural differences. Cambra's initial hypothesis of *S. separata* as a single widespread and variable species could be supported by future discovery of larger series of specimens, especially from new intermediate localities, or by molecular phylogenetics.

Only two true *S. separata* specimens were studied. The smaller bodied individual (6 mm) from near Fortín, has the tooth on T1 greatly reduced, nearly as small as that found in *S. dasylymatos*.

***Silvorientilla bonus* sp. nov.**

Williams and Cambra
(Figs. 7-9)

<http://zoobank.org/732FD1C4-D9A9-4727-8173-BD4F252EB03B>

Diagnosis of female. This species can be recognized by coloration, wherein the mesosoma is uniform orange-brown and T2 has a complete transverse band of whitish setae that medially expands anteriorly nearly to the base of T2. The following characters are also useful for identification: ventrolateral clypeal process weakly bituberculate, T1 medial tooth large, T2 swollen basolaterally with a few strong striae and with a strong medial longitudinal lamellate carina that is obliterated medially, and T3 covered entirely with silvery setae. Body length: 7.5 mm.

Description of female. Coloration. Head dark reddish, except mandible, scape, and clypeus orange-brown. Mesosoma uniform orange-brown. Legs dark orange-brown. Metasoma dark reddish, except T2 with two subcircular yellow

cuticular spots in posterior half. Vertex setae black, frons and gena setae silvery. Mesosoma setae pale golden with some scattered erect brown setae dorsally. T1 and T3-6 setae silvery; T2 setae silvery laterally and forming complete transverse band of silver setae on the posterior half that medially expands anteriorly, reaching the anterior T2 margin. Tibial spurs white. **Head.** Head width $0.9 \times$ pronotal width. Front, vertex and gena dense punctate to tight reticulate, many interspaces reduced to carinae. Clypeus punctate and setose throughout, anterior margin deeply emarginate medially, lateral process obscurely bituberculate. Genal carina distinct, but not reaching hypostomal carina. Mandible oblique, slightly dilating, tridentate with inner tooth forming obtuse angle, ventral margin shallowly sinuate. Antennal scrobe with weak dorsal carina. Length of F1 $2.2 \times$ pedicel; F2 $1.2 \times$ pedicel length. **Mesosoma.** Mesosomal length $0.95 \times$ width. Humeral carina angulates dorsally, weakly continuing to epaulet. Mesosomal dorsum evenly reticulate. Lateral propodeal face with scattered distinct punctures. **Metasoma.** T1 disciform, medial tooth nearly as long as dorsal face, margin between dorsal and anterior faces somewhat carinate. T2 slightly wider than long. Disc of T2 densely reticulate and densely setose, many interspaces obliterated leaving apparent striae; swollen with a few coarse striae basolaterally; medially with a longitudinal lamellate carina that is strong basally and apically, but obliterated medially. T3-5 and S2-5 with dense punctures, interspaces shagreened and densely setose. T6 convex, densely punctate, interspaces mostly smooth, apical portion smooth.

Male. Unknown.

Type material. HOLOTYPE ♀: Mexico: Quintana Roo, Nuevo Xcán, X-Eki, 17.VI.1986, A. Foucart (EMUS).

Distribution. The only specimen was collected near the transition area of the Yucatán moist forest and Yucatán dry forest ecoregions at low elevation (~25m).

Etymology. From the Latin *bonus*, good, and simultaneously from the colloquial American English, *bonus*, meaning something welcomed and usually unexpected that accompanies something that is itself already good. This was the final new species added to this study after most of the MS was

already written. It is named for the 1966 film *The Good, the Bad, and the Ugly*, wherein Clint Eastwood's character, Blondie, was "the good". Treat as noun in apposition.

Remarks. This species superficially resembles *S. separata* and *S. incondinatus* in coloration. These three species belong in the Black-headed *Timulla* Müllerian mimicry ring, as defined in Wilson *et al.* (2015). In fact, the type specimen was photographed and included in the supplemental information for that paper as "*Pseudomethoca* sp."

***Silvorientilla dasylymatos* sp. nov.**

Williams and Cambra

(Figs. 10-11)

<http://zoobank.org/7DB3B05E-CAFC-47E6-B15B-C85EE6784724>

Diagnosis of female. This species can be recognized by coloration, wherein the mesosoma is dorsally blackish and laterally orange-brown and T2 has a complete transverse band of whitish setae that medially expands anteriorly nearly to the base of T2. The following characters are also useful for identification: ventrolateral clypeal process unidentate, T1 medial tooth small, T2 weakly swollen basolaterally with a few striae and without basomedial longitudinal carina, and T3 covered entirely with silvery setae. Body length: 7 mm.

Description of female. Coloration. Head brown-black, except mandible, antenna, clypeus and antennal tubercles brown. Mesosoma orange-brown laterally and ventrally, black dorsally except having anteromedial orange spot. Legs mostly dark brown, coxae, femoral bases, and tarsi lighter orange-brown. Metasoma brown-black, except T2 with two large transverse ovate yellow cuticular spots in posterior half. Head setae silvery. Mesosoma with sparse silvery setae laterally and dorsolaterally and scattered erect brown setae dorsomedially. T1 and T3-6 setae mostly silvery with few interspersed brown setae; T2 setae silvery laterally and forming complete transverse band of silver setae on the posterior half that medially expands anteriorly, loosely reaching the anterior T2 margin. Tibial spurs white. **Head.**

Head width subequal to pronotal width. Front, vertex and gena dense punctate to tight reticulate, many interspaces reduced to carinae. Clypeus punctate and setose throughout, anterior margin deeply emarginate medially, appearing bidentate. Genal carina distinct, but not reaching hypostomal carina. Mandible oblique, slightly dilating, tridentate with inner tooth forming obtuse angle, ventral margin shallowly sinuate. Antennal scrobe with weak dorsal carina. Length of F1 $2.2 \times$ pedicel; F2 $1.2 \times$ pedicel length. **Mesosoma.** Mesosomal length $1.05 \times$ width. Humeral carina angulates dorsally, weakly continuing to epaulet. Mesosomal dorsum reticulate, medially with few interspaces obliterated. Lateral propodeal face with scattered distinct punctures. **Metasoma.** T1 disciform, medial tooth much shorter than dorsal face, margin between dorsal and anterior faces interrupted by some punctures. T2 slightly wider than long. Disc of T2 densely reticulate and densely setose, many interspaces obliterated leaving apparent striae; evenly convex basally. T3-5 and S2-5 with dense punctures, interspaces shagreened and densely setose. T6 convex, densely punctate, interspaces mostly smooth, apical portion smooth.

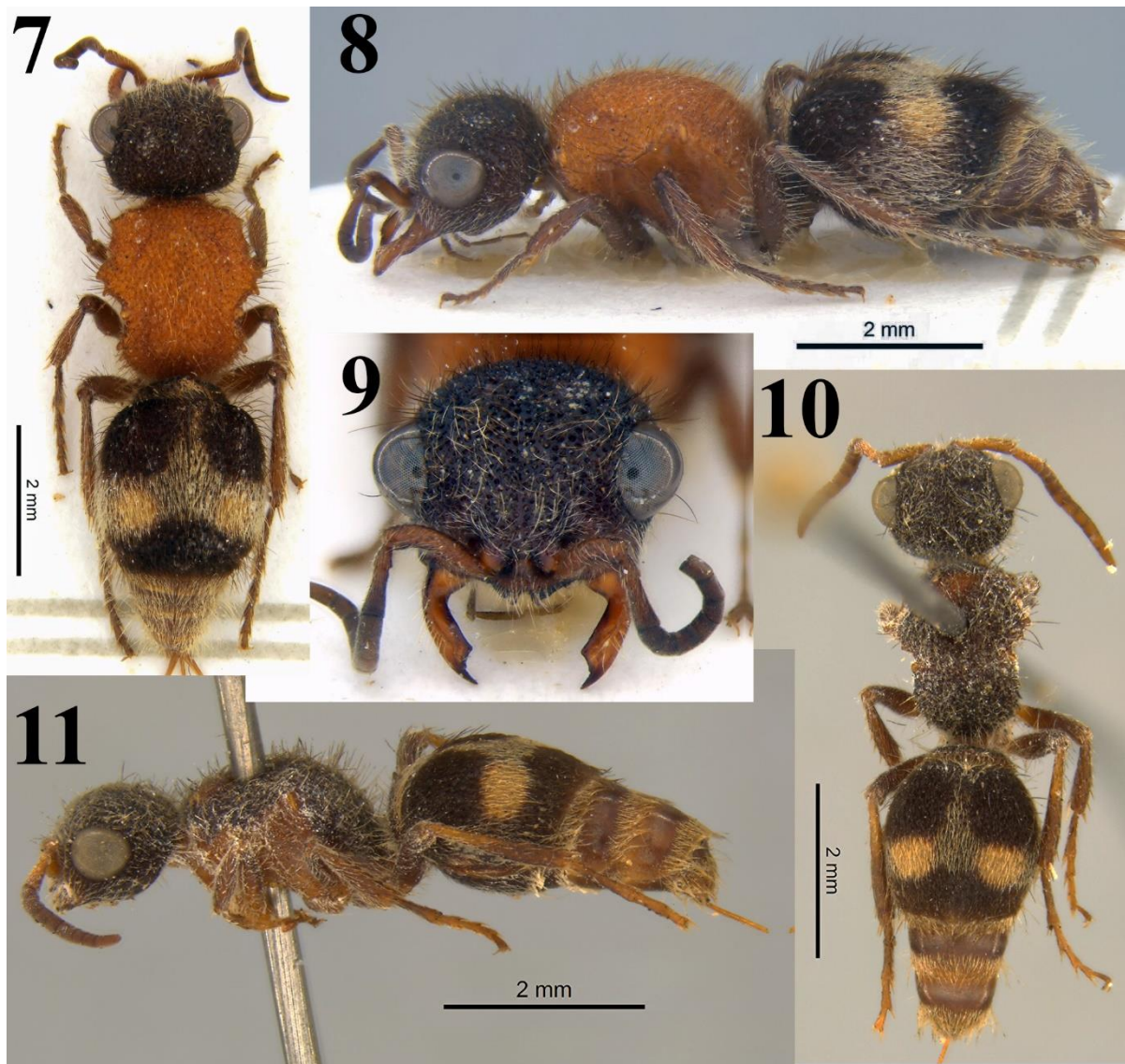
Male. Unknown.

Type material. HOLOTYPE ♀: Guatemala: Mirandilla, 1700 ft, 1914-110, P. Cameron, *Champion* (BMNH).

Distribution. The only specimen was collected in the Sierra Madre de Chiapas moist forest ecoregion on the southern slope of the Sierra Madre de Chiapas.

Etymology. From the ancient Greek *dasy-*, hairy, and *lymatos*, dirt; a play on words based on the 1971 film *Dirty Harry*. Treat as noun in apposition.

Remarks. In this species, the T1 dorsal tooth is smaller than in other *Silvorientilla* species. This is the putative sister species of *S. bonus* from Quintana Roo, Mexico. These are the only *Silvorientilla* species to have the T2 spots connected by a transverse setal band. They are most immediately separated by mesosoma color (darkened dorsally in *S. dasylymatos*), but the weaker sculpture of T2 in *S. dasylymatos* further supports treating these as distinct species.



Figures 7-11. *Silvorientilla* females. (7-9) *S. bonus*, sp. nov. and (10-11) *S. dasylymatos*, sp. nov. (7, 10) Female habitus, dorsal view. (8, 11) Female habitus, lateral view. (9) Female anterior surface of head.

***Silvorientilla incondinatus* sp. nov.**

Williams and Cambra

(Figs. 12–17)

<http://zoobank.org/E7C8D3DB-6D6A-457E-8F65-CAD9EF003B58>

Diagnosis of female. This species can be recognized by coloration, wherein the head is dorsally covered with black setae, the mesosoma is mostly orange-brown, the T2 setae are black between the yellow cuticular spots, and T3 has the setae mostly black. The following characters are also useful for identification: ventrolateral clypeal process bituberculate, T1 medial tooth large, and T2 scarcely swollen basolaterally and

with basomedial carina indistinct. Body length: 9 mm.

Diagnosis of male. This species is recognized by having the head and pronotum clothed with mostly black setae and having the first flagellomere uniform brown and $1.4 \times$ longer than F2. Additionally, the clypeus is narrowly bidentate, T2 has a weak longitudinal gibbous ridge, and the penis valve curves down at a 135° angle. Body length: 9 mm.

Description of female. Coloration. Head black, except mandible and scape dark brown. Mesosoma orange-brown except lateral and posterior propodeal face ventrally brown. Legs black- brown. Metasoma black, except T2

two subcircular yellow cuticular spots in posterior half. Head setae silvery ventrally, black dorsally. Mesosoma with sparse short silvery setae except mesonotum and metapectal-propodeal disc dorsally with sparse yellow orange setae, mesosomal dorsum with erect black-brown setae. T1 and T4-6 setae entirely silvery; T2-3 setae silvery laterally and on yellow spots, remaining setae black. Tibial spurs white. **Head.** Head width slightly broader than pronotal width. Front, vertex and gena punctation tight reticulate, interspaces reduced to carinae. Clypeus punctate and setose throughout, anterior margin deeply emarginate medially, lateral process bituberculate, giving clypeus tetradentate appearance. Genal carina distinct, but not reaching hypostomal carina. Mandible oblique, dilating, tridentate with inner tooth large, ventral margin shallowly sinuate. Antennal scrobe with dorsal carina. Length of F1 $2.5 \times$ pedicel; F2 $1.1 \times$ pedicel length. **Mesosoma.** Mesosomal length $1.1 \times$ width. Humeral carina angulates dorsally, continuing to epaulet. Mesosomal dorsum reticulate, medially with few interspaces obliterated. Lateral propodeal face with few small indistinct punctures. **Metasoma.** T1 disciform, medial tooth nearly as long as dorsal face, margin between dorsal and anterior faces somewhat carinate. T2 length subequal to width. Disc of T2 densely micro-reticulate and densely setose; with scarcely perceptible longitudinal carina basomedially, without striae basolaterally. T3-5 and S2-5 with dense punctures, interspaces shagreened and densely setose. T6 convex, densely punctate, interspaces mostly smooth, apical portion smooth.

Description of male. Coloration. Head, mesosoma, and legs brown-black, mandible, clypeus, antennal tubercle, fore coxae, and tarsi lighter brown. Metasoma entirely orange. Tibial spurs white. Wings light brown, veins dark brown. Head and mesosoma setae yellow-gray, except frons and vertex with few scattered brownish setae and mesoscutum entirely with dark brown setae. Metasomal setae entirely pale orange. **Head.** Rounded posteriorly, with dense punctures. Mandible tridentate apically, inner tooth broadly rounded. Clypeus ventral margin narrow bidentate. Gena not carinate. Ocelli small; OOD distance $5.1 \times$ DLO, IOD $0.9 \times$

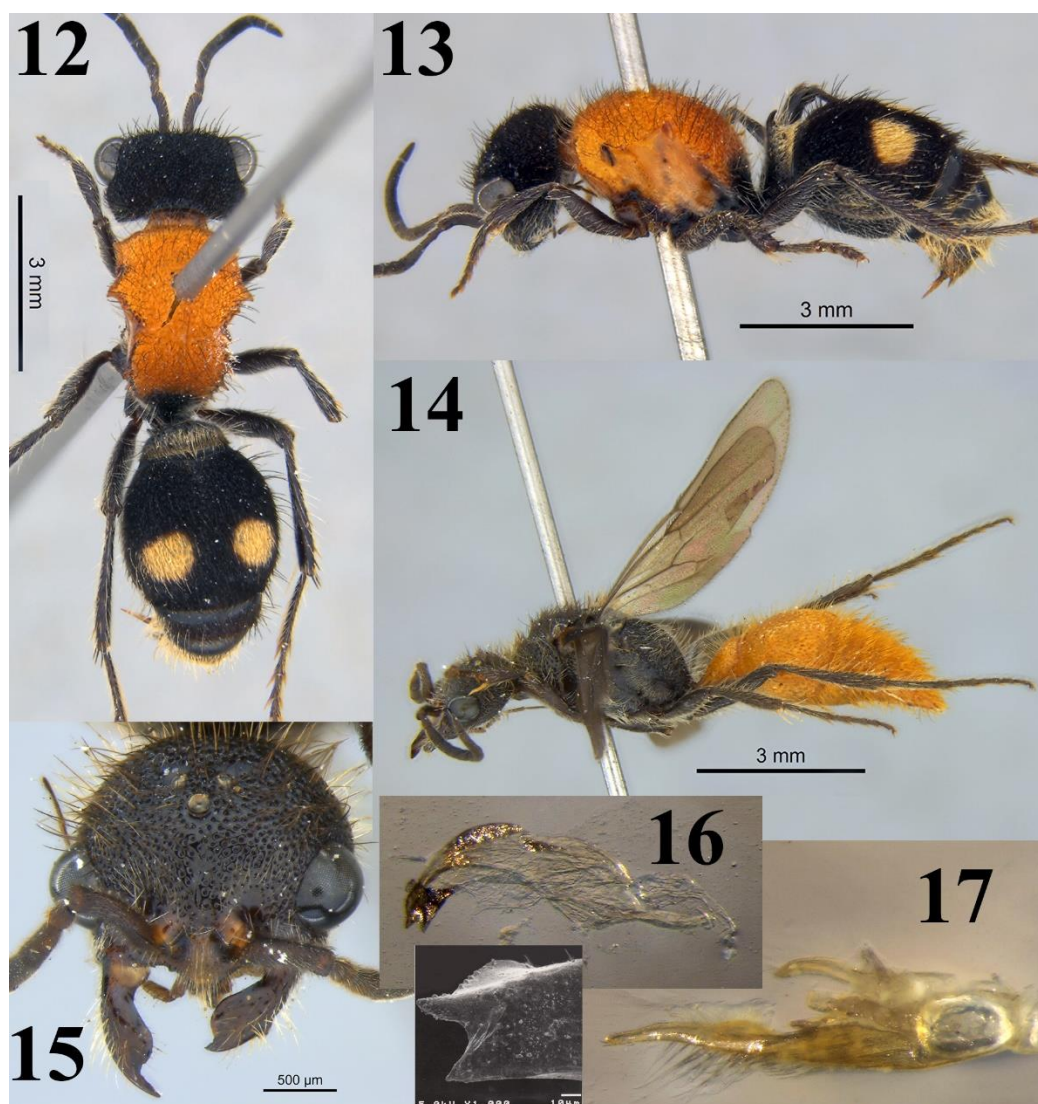
DLO. Basal scapal lamella rounded, occupying basal $0.4 \times$ total scape length. F1 $2.0 \times$ pedicel length; F2 $1.5 \times$ pedicel length. **Mesosoma.** Pronotum, mesoscutum, and mesoscutellum with dense simple punctures. Tegula smooth, margins sparse setigerous punctate. Mesopleuron with coarse confluent punctures. Axilla sessile with mesoscutum with coarse confluent punctures. Propodeum full reticulate, lateral face smooth anteriorly. **Metasoma.** T1 elongate sub-sessile with dense oblique punctures. T2 disc and S2 with large dense punctures, simple erect setae, and with interspaces smooth; T2 fringe setae dense, thick, incurved. T2 with weakly raised medial line terminating in obscure tubercle just anterior to fringe. T3-6 punctures dense. T7 dense punctate except apex smooth. Hypopygium punctate, truncate posteriorly. **Genitalia.** Paramere elongate, obliquely dorsoventrally flattened, apically slender digitiform, with sparse short scattered setae and sharp upcurved tooth at extreme apex; with swollen densely setose lobe on inner face near mid-length; dorsolateral face densely setose from base of paramere to length at apex of setose lobe. Parapenial lobe well developed, acute. Volsella with cuspis and digitus short; cuspis pad-like, shorter than digitus and as long as parapenial lobe, with short setae apicolaterally; digitus finger-like, slightly longer than cuspis or parapenial lobe, asetose. Penis valve extending beyond parapenial lobe and volsella, bidentate apicoventrally, downcurving at 135° to apex.

Type material. HOLOTYPE ♀: Panama, Coclé, Parque Nacional Omar Torrijos, 900 m, 24.IX.1990, R. Cambra (CSCA). ALLOTYPE ♂: Same data as holotype (CSCA). Paratypes: same data, 18-19.II.1986, R. Cambra (1♀, MIUP), 21.II.1990, R. Cambra (1♀, MIUP).

Distribution. Known only from the Talamancan montane forest ecoregion.

Etymology. From the Latin prefix *in-*, not, and *condinatus*, pardonable; named for the 1992 film, *Unforgiven*, in which Clint Eastwood served as director and leading actor. Treat as noun in apposition.

Remarks. This is the southeastern most distributed *Silvorientilla* species. The sex association is based on the holotype female and allotype male that were collected *in copula* by RAC.



Figures 12-17. *Silvorientilla incondinatus*, sp. nov. (12) Female habitus, dorsal view. (13) Female habitus, lateral view. (14) Male habitus, lateral view. (15) Male anterior surface of head. (16) Male penis valve, lateral view; Scanning Electron Microscopy (SEM) insert showing details of penis valve apex. (17) Male genitalia, dorsal view.

***Silvorientilla philobeddoe* sp. nov.**

Williams and Cambra

(Figs 18-23)

<http://zoobank.org/D0128D71-8E2D-4CA1-8FFB-C5BA269F4EDE>

Diagnosis of female. This species is unique in having the longitudinal lamellate carina of T2 distinct, but restricted to the basal half of T2, and the yellow T2 spots large, nearly reaching the felt line laterally. The following characters may also aid in diagnosis: the mesosoma is black; the ventrolateral clypeal process is unidentate; the T2 setae are black between the yellow cuticular spots; T2 is swollen basolaterally with numerous

distinct longitudinal carinae; and T3 is covered entirely with silvery setae. Body length: 8.5 mm.

Diagnosis of male. This species is recognized by the following combination of characters: the head and pronotum clothed with mostly silvery setae, mesoscutum setae mostly black, F1 has a yellow-brown patch basally and is 1.1 × longer than F2; the clypeus is truncate and scarcely dentiform apicolaterally, T2 is evenly convex, and the penis valve curves down at a 125° angle. Body length: 8 mm.

Description of female. Coloration. Body brown-black, except T2 with pair of large subcircular yellow spots in posterior half; mandible, clypeus, and apical metasomal segments lighter brown.

Head setae sparse silvery ventrally, denser silver dorsally. Mesosoma with sparse short silvery setae laterally and posteriorly; pronotum and metapectal-propodeal disc with somewhat denser silvery setae; mesonotum setae mostly black. T1 and T3-6 setae entirely pale golden; T2 setae silvery laterally, pale golden on cuticular spots and anteromedial triangular patch, remaining setae black. Tibial spurs white. **Head.** Head width subequal to pronotal width. Front, vertex and gena dense punctate to tight reticulate, most interspaces reduced to carinae. Clypeus punctate and setose throughout, anterior margin deeply emarginate medially, appearing bidentate. Genal carina distinct, but not reaching hypostomal carina. Mandible oblique, slightly dilating, tridentate with inner tooth forming obtuse angle, ventral margin shallowly sinuate. Antennal scrobe with dorsal carina almost obliterated by punctation. Length of F1 $2.7 \times$ pedicel; F2 $1.2 \times$ pedicel length. **Mesosoma.** Mesosomal length $1.15 \times$ width. Humeral carina angulates dorsally, continuing to epaulet. Mesosomal dorsum reticulate, medially with few interspaces obliterated. Lateral propodeal face with scattered punctures. **Metasoma.** T1 disciform, medial tooth nearly as long as dorsal face, margin between dorsal and anterior faces distinct. T2 length subequal to width. Disc of T2 densely reticulate and densely setose; with distinct longitudinal lamellate carina basomedially, obscurely swollen and with numerous weak longitudinal tubercles basolaterally. T3-5 and S2-5 with dense punctures, interspaces shagreened and densely setose. T6 convex, densely punctate, interspaces mostly shagreened, apical portion impunctate.

Description of male. Coloration. Head, mesosoma, and legs brown-black, mandible, clypeus, base of F1, fore coxae, and tarsi lighter brown. Metasoma orange, basal half of T1 and entire S1 dark brown. Tibial spurs white. Wings light brown, veins brown. Head and mesosoma setae laterally and ventrally gray, dorsally interspersed dark brown and gray, except mesoscutum entirely with dark brown setae. Metasomal setae entirely pale orange. **Head.** Rounded posteriorly, with dense punctures. Mandible tridentate apically, inner tooth broadly rounded. Clypeus ventral margin truncate with

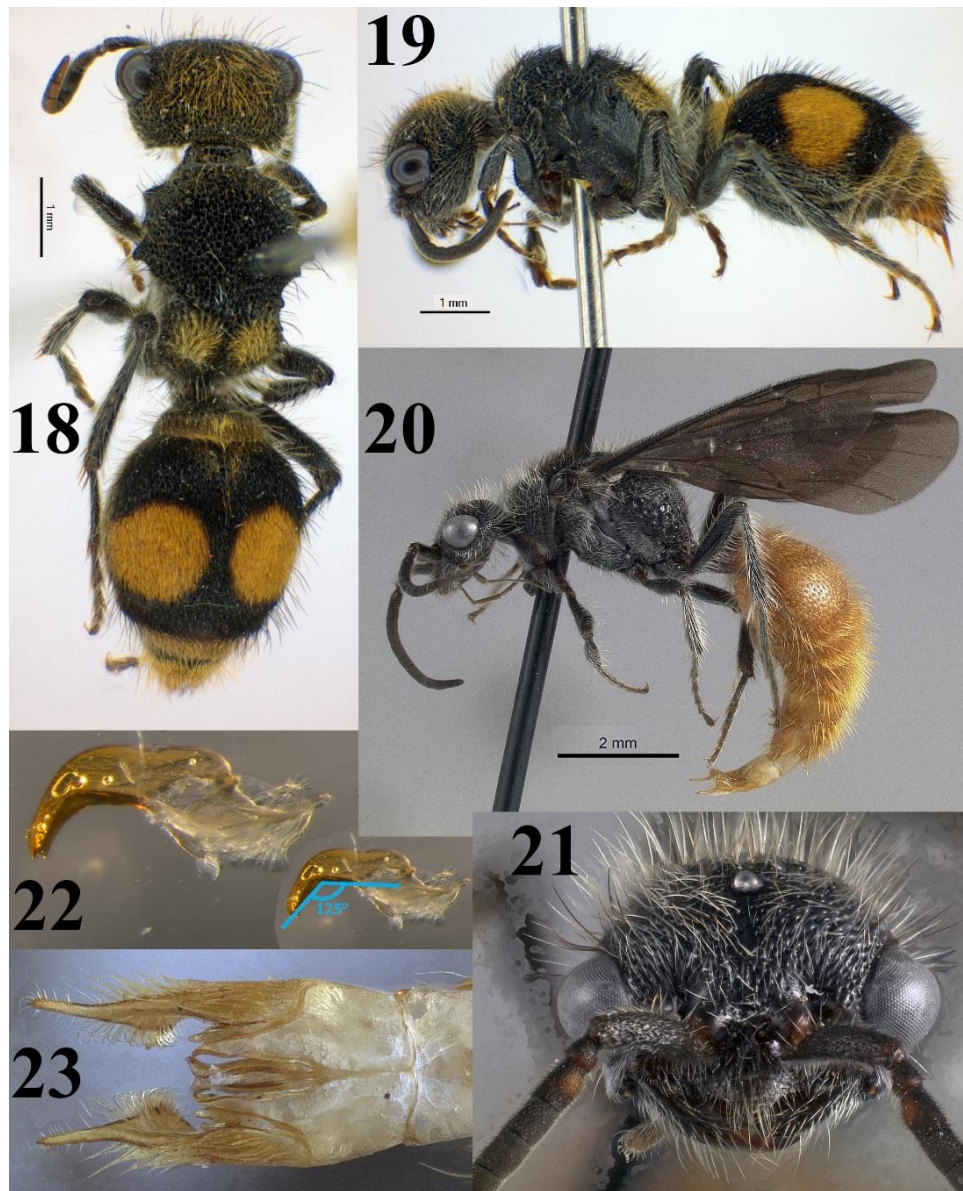
corners scarcely dentiform. Gena not carinate. Ocelli small; OOD distance $5 \times$ DLO, IOD subequal to DLO. Basal scapal lamella truncate-rounded, occupying basal $0.4 \times$ total scape length. F1 $1.9 \times$ pedicel length; F2 $1.8 \times$ pedicel length. **Mesosoma.** Pronotum, mesoscutum, and mesoscutellum with dense simple punctures. Tegula smooth, margins sparse setigerous punctate. Mesopleuron with coarse confluent punctures. Axilla sessile with mesoscutum with dense coarse punctures. Propodeum full reticulate, lateral face smooth anteriorly. **Metasoma.** T1 elongate subsessile with dense oblique punctures. T2 disc and S2 with large dense punctures, simple erect setae, and with interspaces smooth; T2 fringe setae dense, thick, incurved. Swollen T2 disc without medial line or apicomedial tubercle. T3-6 punctures dense. T7 dense punctate except apex smooth. Hypopygium punctate, truncate posteriorly. **Genitalia.** Paramere elongate, obliquely dorsoventrally flattened, apically slender digitiform, with sparse short scattered setae and sharp upcurved tooth at extreme apex; with swollen densely setose lobe on inner face near mid-length; dorsolateral face densely setose from base of paramere to length at apex of setose lobe. Parapenial lobe well developed, acute. Volsella with cuspis and digitus short; cuspis pad-like, shorter than digitus or parapenial lobe, with short setae apicolaterally; digitus finger-like, as long as parapenial lobe, asetose. Penis valve extending beyond parapenial lobe and volsella, bidentate apicoventrally, downcurving at 125-degrees to apex.

Type material. HOLOTYPE ♀: Mexico, Veracruz, Estacion Biologia Los Tuxtlas, $18^{\circ} 35.107' N 95^{\circ} 04.506' W$, 150 m, 15-16.V.2011, hand collected, J. Rodriguez and K. A. Williams (EMUS). ALLOTYPE ♂: Same data as holotype (EMUS). PARATYPES: Same data as holotype: 12-14.V.2011 (1♀, EMUS); 15-16.V.2011 (1♀, 4♂, CSCA, EMUS, MIUP).

Distribution. This species was found in the Sierra de los Tuxtlas ecoregion.

Etymology. Named for the fictional character Philo Beddoe, played by Clint Eastwood in the 1978 film *Every Which Way but Loose*. Treat as noun in apposition.

Remarks. This species is known only from the type series, collected by KAW in Veracruz,



Figures 18-23. *Silvorientilla philobeddoe*, sp. nov. (18) Female habitus, dorsal view. (19) Female habitus, lateral view. (20) Male habitus, lateral view. (21) Male anterior surface of head. (22) Male penis valve, lateral view; insert showing calculation of downward curve angle. (23) Male genitalia, dorsal view.

Mexico. Multiple males and females were found in late morning on low roadside vegetation near the Estacion de Biologia Los Tuxtlas. Based on females having a strong longitudinal lamellate carina on T2, this species is likely closely related to *S. separata*. Although both species occur in Veracruz, they were found in different ecoregions, with *S. philobeddoe* found at 150m near the Atlantic Ocean and *S. separata* found above 900m along the inland Sierra Madre Oriental.

***Silvorientilla proसारसोर* sp. nov.**

Williams and Cambra

(Figs. 3–6)

<http://zoobank.org/F7632E9F-1FA8-4EA4-811B-FCCA018E7DFF>

Diagnosis of male. This species is recognized by the following combination of characters: the head and pronotum clothed with mostly silvery setae, the mesoscutum with interspersed golden and brown setae, pedicel and F1 entirely yellow-brown anteriorly, F1 1.2 × longer than F2; the

clypeus is bidentate, T2 basically evenly convex, and the penis valve curves down at a 120° angle. Body length: 7–8 mm.

Description of male. Coloration. Head, mesosoma, and legs brown-black, mandible, clypeus, pedicel, F1, scape, tegula, fore coxae, and tarsi lighter brown. Metasoma orange, dark brown at base of T1, S1 and S2 mostly brown. Tibial spurs white. Wings brown, veins brown. Head and mesosoma setae yellow-gray, except frons and vertex with few scattered brownish setae and mesoscutum with interspersed golden and pale brown setae. Metasomal setae entirely pale orange. **Head.** Rounded posteriorly, with dense punctures. Mandible tridentate apically, inner tooth broadly rounded. Clypeus ventral margin bidentate. Gena not carinate. Ocelli small; OOD distance $5.9 \times$ DLO, IOD subequal to DLO. Basal scapal lamella rounded, occupying basal $0.3 \times$ total scape length. F1 $1.8 \times$ pedicel length; F2 $1.3 \times$ pedicel length. **Mesosoma.** Pronotum, mesoscutum, and mesoscutellum with dense simple punctures. Tegula smooth, margins sparse setigerous punctate. Mesopleuron with coarse punctures. Axilla sessile with mesoscutum with coarse contiguous punctures. Propodeum full reticulate, lateral face smooth anteriorly. **Metasoma.** T1 elongate sub-sessile with dense oblique punctures. T2 disc and S2 with large dense punctures, simple erect setae, and with interspaces smooth; T2 fringe setae dense, thick, incurved. T2 without raised medial line. T3–6 punctures dense. T7 dense punctate except apex smooth. Hypopygium punctate, truncate posteriorly. **Genitalia.** Paramere elongate, obliquely dorsoventrally flattened, apically slender digitiform, with sparse short scattered setae and sharp upcurved tooth at extreme apex; with swollen densely setose lobe on inner face near mid-length; dorsolateral face densely setose from base of paramere to length at apex of setose lobe. Parapenial lobe well developed, acute. Volsella with cuspis and digitus short; cuspis pad-like, shorter than digitus or parapenial lobe, with short setae apicolaterally; digitus finger-like, nearly as long as parapenial lobe, asetose. Penis valve extending beyond parapenial lobe and volsella, bidentate apicoventrally, downcurving at 120-degrees to apex.

Female. Unknown.

Type material. HOLOTYPE ♂: Mexico, Oaxaca, Metate, 85.5 km SW of Tuxtepec, 900m, 20.X.1962, H. & M. Townes (EMUS). PARATYPE ♂: Same data as holotype: 19.X.1962 (EMUS).

Distribution. The type specimens were collected along the southeastern slopes of the Sierra Madre Oriental, apparently in the Petén-Veracruz moist forest ecoregion.

Etymology. From the Latin terms *pro*, for, and *soror*, sister, and the name Sara; based on the 1970 film *Two Mules for Sister Sara*, starring Shirley MacLaine and Clint Eastwood and based in Mexico; also, an allusion to the type series (two males for sister Sara). Treat as noun in apposition.

Remarks. This species was collected at similar elevation and potentially in the same ecoregion as *S. separata*. There are also general similarities in the penis valve shape, F1 length, and coloration to *S. philobeddoe*, the putative sister species of *S. separata*. These data suggest *S. separata* as the most likely candidate for sex association with *S. proसारसर*. The distribution of species in this genus is poorly understood, however, and the nearest records of *S. separata* are still 150 km away from the type series. There is not yet sufficient evidence to treat *S. proसारसर* as conspecific with *S. separata*.

***Silvorientilla sinenomine* sp. nov.**

Williams and Cambra

(Figs. 24–29)

<http://zoobank.org/6EFFFEB8-7102-48A9-97C6-B295E4F6431F>

Diagnosis of female. This species can be recognized by coloration, wherein the head is dorsally covered with pale golden setae, the mesosoma is black, the T2 setae are black between the yellow cuticular spots, and T3 has the setae mostly black. The following characters are also useful for identification: ventrolateral clypeal process unidentate, T1 medial tooth large, and T2 scarcely swollen basolaterally and with basomedial carina indistinct. Body length: 9–11 mm.

Diagnosis of male. This species is recognized by the following combination of characters: the

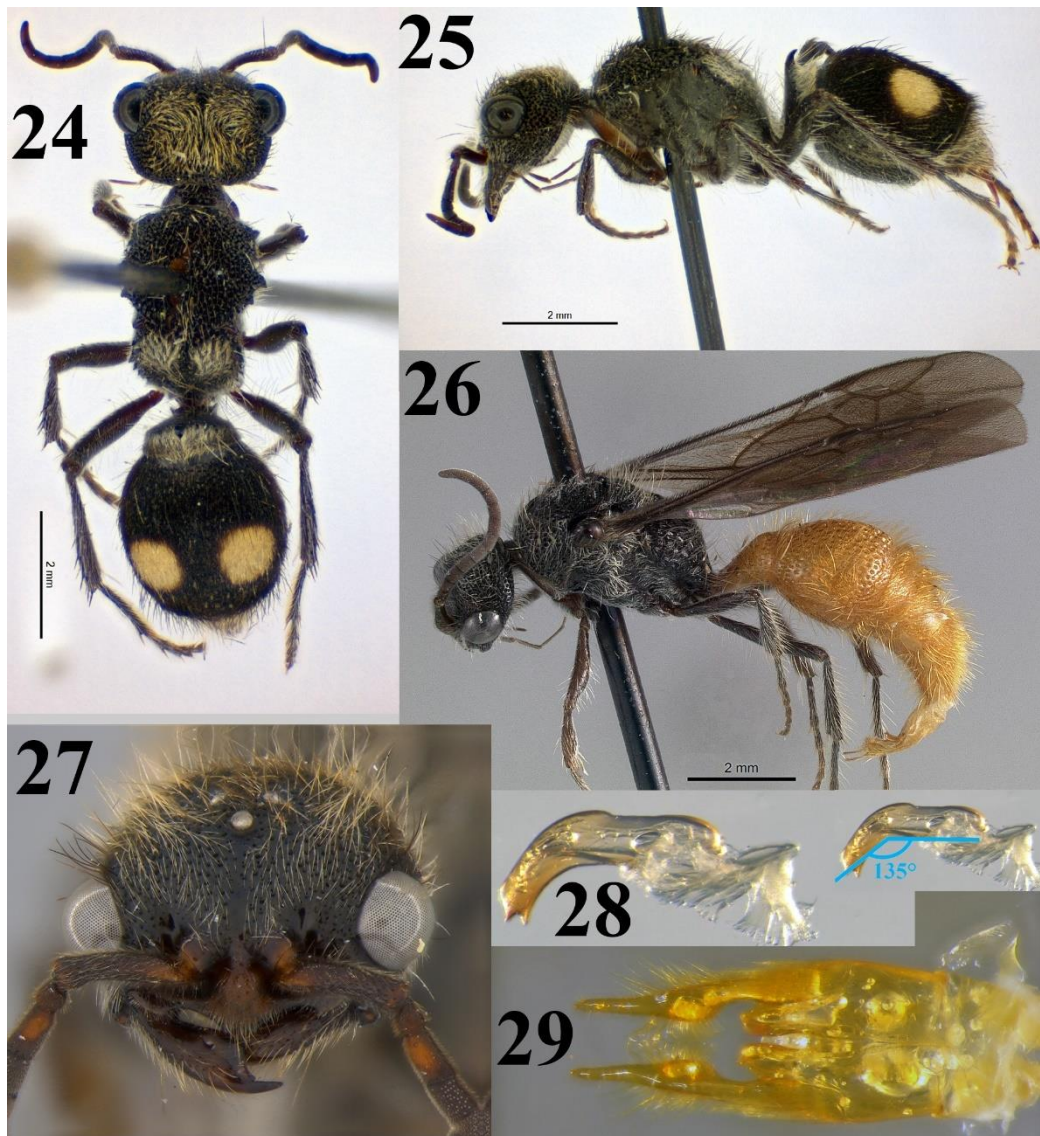
head and pronotum clothed with mostly silvery setae, F1 usually has a yellow-brown patch basally and is 1.1-1.2 × longer than F2; the clypeus is bidentate apicolaterally, T2 has a longitudinal swollen ridge, and the penis valve curves down at a 135° angle. Body length: 7-10.5 mm.

Description of female. Coloration. Body brown-black, except T2 with pair of large subcircular whitish-yellow spots; mandible, clypeus, and apical metasomal segments lighter brown. Head setae silvery ventrally, pale golden dorsally with few erect brown setae. Mesosoma with sparse short silvery setae laterally and posteriorly; pronotum and metapectal-propodeal disc with somewhat dense pale golden setae; mesonotum setae mostly black. T1 and T4-6 setae entirely silvery; T2-3 setae silvery laterally and on yellow spots, remaining setae black. Tibial spurs white. **Head.** Head width 1.1 × pronotal width. Front, vertex and gena dense punctate to tight reticulate, many interspaces reduced to carinae. Clypeus punctate and setose throughout, anterior margin deeply emarginate medially, appearing bidentate. Genal carina distinct, but not reaching hypostomal carina. Mandible oblique, slightly dilating, tridentate with inner tooth forming obtuse angle, ventral margin shallowly sinuate. Antennal scrobe with weak dorsal carina. Length of F1 2.7 × pedicel; F2 subequal to pedicel length. **Mesosoma.** Mesosomal length 1.1 × width. Humeral carina angulates dorsally, practically obliterated before epaulet. Mesosomal dorsum reticulate, medially without apparent striae caused by obliterated interspaces. Lateral propodeal face with few distinct punctures. **Metasoma.** T1 disciform, medial tooth nearly as long as dorsal face, margin between dorsal and anterior faces distinct. T2 length subequal to width. Disc of T2 punctate, interspaces micropunctate and densely setose; evenly convex basally, with few indistinct striae basolaterally. T3-5 and S2-5 with dense punctures, interspaces shagreened and densely setose. T6 convex, densely punctate, interspaces mostly smooth, apical portion smooth.

Description of male. Coloration. Head, mesosoma, and legs brown-black, mandible, clypeus, F1, base of scape, fore coxae, and tarsi lighter brown. Metasoma orange, dark brown at

base of T1 and S1. Tibial spurs white. Wings light brown, veins brown. Head and mesosoma setae yellow-gray, except frons and vertex with few scattered brownish setae and mesoscutum entirely with dark brown setae. Metasomal setae entirely pale orange. **Head.** Rounded posteriorly, with dense punctures. Mandible tridentate apically, inner tooth broadly rounded. Clypeus ventral margin bidentate. Gena not carinate. Ocelli small; OOD distance 5.8 × DLO, IOD subequal to DLO. Basal scapal lamella truncate-rounded, occupying basal 0.4 × total scape length. F1 1.8 × pedicel length; F2 1.7 × pedicel length. **Mesosoma.** Pronotum, mesoscutum, and mesoscutellum with dense simple punctures. Tegula smooth, margins sparse setigerous punctate. Mesopleuron with coarse contiguous punctures. Axilla sessile with mesoscutum with coarse contiguous punctures. Propodeum full reticulate, lateral face smooth anteriorly. **Metasoma.** T1 elongate sub-sessile with dense oblique punctures. T2 disc and S2 with large dense punctures, simple erect setae, and with interspaces smooth; T2 fringe setae dense, thick, incurved. T2 with raised medial line terminating in longitudinal ridge-like tubercle just anterior to fringe. T3-6 punctures dense. T7 dense punctate except apex smooth. Hypopygium punctate, truncate posteriorly. **Genitalia.** Paramere elongate, obliquely dorsoventrally flattened, apically slender digitiform, with sparse short scattered setae and sharp upcurved tooth at extreme apex; with swollen densely setose lobe on inner face near mid-length; dorsolateral face densely setose from base of paramere to length at apex of setose lobe. Parapenial lobe well developed, acute. Volsella with cuspis and digitus short; cuspis pad-like, shorter than digitus or parapenial lobe, with short setae apicolaterally; digitus finger-like, as long as parapenial lobe, asetose. Penis valve extending beyond digitus and volsella, bidentate apicoventrally, downcurving at 135-degrees to apex.

Type material. HOLOTYPE ♀: Costa Rica, Alajuela, Costa Rica, Alajuela, Bijagua, 20 km S Upala, 26.III-12.IV.1991, F.D. Parker (EMUS). ALLOTYPE ♂: Costa Rica, Alajuela, Bijagua, 20 km S Upala, 10-29.V.1991, F.D. Parker (EMUS). PARATYPES: Costa Rica: Alajuela: Estacion San Ramon, 620 m, 26.IV-24.V.1994, Fam. Hur-



Figures 24-29. *Silvorientilla sinenomine*, sp. nov. (24) Female habitus, dorsal view. (25) Female habitus, lateral view. (26) Male habitus, lateral view. (27) Male anterior surface of head. (28) Male penis valve, lateral view; insert showing calculation of downward curve angle. (29) Male genitalia, dorsal view.

gado Garcia, L. N 318100_381900 # 2911 (1♂, INBIO); same data as holotype: 30.V.1990 (1♂, EMUS); 13.XII.1990–9.I.1991 (1♂, EMUS); 12-30.IV.1991 (2♂, EMUS); 10-29.V.1991 (1♂, EMUS); Guanacaste: Estacion Pitilla, 9 km S Santa Cecilia: II.1990, P. Rios, C. Moraga, & R. Blanco, 330200–280200 (1♀, INBIO); 22.X-2.XI.1992, C. Moraga (1♀, MIUP); V.1990, Finca Montezuma, 3 km SE Rio Naranjo, F. D. Parker: 1-10.VII.1992 (1♂, EMUS); 11-20.VII.1992 (1♂, EMUS); 1-10.IX.1992 (1♂, EMUS); 8.VI.1993 (1♂, EMUS); II Curso Parataxon, L-N-880200, 880200 (1♀, INBIO); Estacion Pitilla, Finca Pasmompa, 400 m, 5 km

SW Santa Cecilia, III.1989, GNP Biodiversity Survey (1♀, MIUP); III.1994, C. Moraga (1♀, MIUP). Heredia: Estacion Magsasay, Parque Nacional Braulio Carrillo, 200m, 22-23.VI.1991, M.A. Zumbado, L-N-264600, 531000 (1♀, INBIO); La Selva, MT408, 20.III-3.IV.1997 (1♂, EMUS); El Ceibo, Parque Nacional Braulio Carrillo, 400-600 m, X.1989, R. Aguilar & M. Zumbado (1♀, MIUP). Puntarenas: San Vito, III.1993, F.D. Parker (1♂, EMUS); San Vito, Las Alturas, 1500 m, VI.1991, P. Hanson (1♂, EMUS); Panama: Chiriquí, Ojo de Agua, Santa Clara to Finca Hartmann, 29.VI-3.VII.1996, 8° 51' 42" N 82° 44' 36" W, 1500 m, L. Packer and

W.T. Wcislo (1♀, EMUS); Renacimiento, Rio Sereno, Copal, 7.II.1994, A. Rodríguez (1♀, CSCA), Renacimiento, Rio Sereno, Miraflores, 8.II.1994, A. Rodríguez (1♀, MIUP).

Distribution. Recorded from the Costa Rican seasonal moist forest, Isthmian-Atlantic moist forest, and Isthmian-Pacific moist forest ecoregions throughout Costa Rica and western Panama.

Etymology. From the Latin *sine*, without, and *nomen*, name; named for the character of the “Man with No Name” played by Clint Eastwood in the Dollars Trilogy directed by Sergio Leone in the 1960’s. Treat as noun in apposition.

Remarks. This is the only species known from multiple ecoregions and many specimens. The sex association is based on overlapping distribution of males and females, including the holotype and allotype, which were collected in the same locality. In males, there is slight variation in the extent of silvery and blackish setae on the head, though there are always more silver than black setae, unlike *S. incondinatus* males. In females, there is slight variation in the size of the yellow spots on T2, though they are always subcircular and never as large as those of *S. philobeddoe*.

Based on the female metasoma, this is apparently closely related to *S. incondinatus*, as both lack a distinct basomedial longitudinal carina on T2, have T2 evenly convex basally, and have T3 with the setae mostly black. The male penis valve of both species also curves down at the same angle (135°). This is the most southeastern known species of *Silvorientilla*.

Key to species of *Silvorientilla* (Females)

Unknown in *S. proसारoror*, sp. nov.

- 1. T2 with entire transverse silvery setal band, covering yellow spots and expanding anteromedially nearly to anterior T2 margin (Figs. 7, 10). **2**
- 1'. Space between yellow spots of T2 with black setae, silvery setae of T2 restricted to spots, lateral margins, or basomedial patch (Figs. 1, 12, 18, 24) **3**
- 2⁽¹⁾. Mesosoma black dorsally, orange laterally and ventrally (Fig. 11); T2 basically convex with barely perceptible longitudinal carinae (Guatemala) ***S. dasylymatos*, sp. nov.**

- 2'. Mesosoma uniform orange-brown (Fig. 8); T2 with distinct longitudinal carina baso-medially and swollen and carinate basolaterally (Quintana Roo, Mexico) ***S. bonus*, sp. nov.**
- 3⁽¹⁾. T3 clothed with black setae (Fig. 12); T2 basically convex with barely perceptible longitudinal carinae (Costa Rica and Panama) **4**
- 3'. T3 clothed with whitish setae (Fig. 2); T2 with distinct longitudinal basomedial carina (Veracruz, Mexico) **5**
- 4⁽³⁾. Mesosoma orange-brown; dorsal head setae black (Fig. 12); lateral clypeal process bituberculate (Coclé, Panama) ***S. incondinatus*, sp. nov.**
- 4'. Mesosoma black; dorsal head setae silver (Fig. 24); lateral clypeal process unidentate (Chiriquí, Panama to Costa Rica) ***S. sinenomine*, sp. nov.**
- 5⁽³⁾. Mesosoma orange-brown (Fig. 1); longitudinal T2 carina extending from base nearly to apex (Veracruz, Mexico) ***S. separata* (Smith, 1879).**
- 5'. Mesosoma black (Fig. 18); longitudinal T2 carina restricted to basal half of disc (Veracruz, Mexico) ***S. philobeddoe*, sp. nov.**

Key to species of *Silvorientilla* (Males)

Unknown in *S. bonus*, sp. nov., *S. dasylymatos*, sp. nov., and *S. separata*.

- 1. Flagellum uniform dark brown, F1 1.4 × F2 (Fig. 15); vertex and pronotum with extensive brown to black setae interspersed with sparser gray setae (Figs. 14, 15; Coclé, Panama) ***S. incondinatus*, sp. nov.**
- 1'. F1 usually with orange-brown patch basally, F1 1.1–1.2 × F2 (Fig. 21); vertex and pronotum generally with setae exclusively silver or gray (Figs. 20, 21; Chiriquí, Panama to Veracruz, Mexico) **2**
- 2⁽¹⁾. T2 with weak longitudinal gibbous ridge terminating in an apparent tubercle apicomediaally; penis valve curving down at 135-degree angle (Fig. 28; Costa Rica, Panama) ***S. sinenomine*, sp. nov.**
- 2'. T2 basically uniform convex; penis valve curving down at 120 or 125-degree angle (Fig. 22; Mexico) **3**

- 3⁽²⁾. Pedicel and F1 entirely yellow-brown ventrally (Fig. 4); mesoscutum with extensive golden-brown setae (Fig. 3; Oaxaca, Mexico) *S. proसारसर*, sp. nov.
 3'. Antenna blackish, except F1 with distinct yellow-brown spot (Fig. 21); mesoscutum setae mostly blackish (Fig. 20; Veracruz, Mexico) *S. philobeddoe*, sp. nov.

DISCUSSION

In the six known females, there seem to be three distinct sister relationships based on metasomal coloration and structure. These also loosely correspond to geographical distribution. In Quintana Roo, Mexico and Guatemala, there are two species that have an entire transverse and anteromedially expanded band of whitish setae on T2: *S. dasylymatos* and *S. bonus*. The southeasternmost species pair in Costa Rica and Panama, *S. incondinatus* and *S. sinenomine*, both

have T3 clothed with black setae, unlike the other species that each have T3 clothed with whitish setae. Finally, the northwesternmost species pair in Veracruz, Mexico, *S. separata* and *S. philobeddoe*, both have a distinct longitudinal raised lamellate carina on T2.

The species treated here are rare, with six of the seven species recognized from fewer than 10 specimens in a small area (Fig. 30). There are many possible reasons for this rarity. First, most of the species occur in isolated mountain ranges. Second, based on the pygidial morphology, the females likely attack arboreal hosts in dense forests, making them more difficult to find than other genera. There are not yet enough data to know whether narrow seasonal activity or host ranges may also contribute to the rarity of these wasps. Hopefully, this paper will allow identification of additional specimens or facilitate description of new species in *Silvorientilla*.

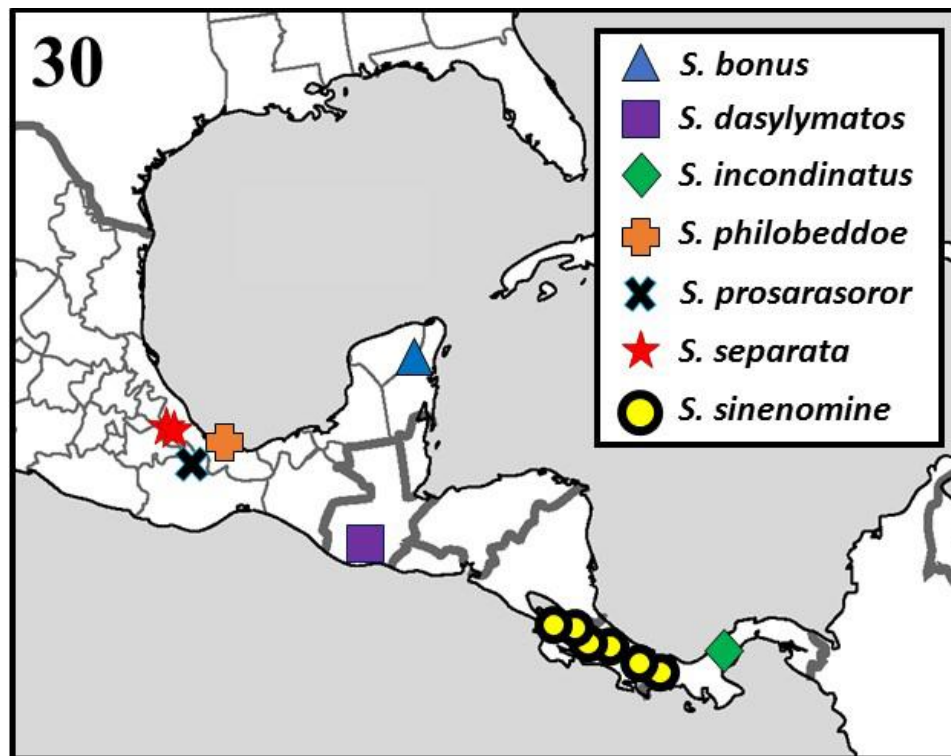


Figure 30. Distribution of *Silvorientilla* species

Among the various genera of Pseudomethocini, *Silvorientilla* is unique most notably in female T1 shape and male genitalia, as mentioned in the diagnosis above.

Based on affinities to other genera and traits apparently unique to the group, *Silvorientilla* belongs to the tribe Pseudomethocini of the subfamily Sphaerophthalminae (Brothers and

Lelej, 2017). Specifically, the females of this tribe have the mesosoma constricted at the propodeal spiracles and males have the axillae unarmed while lacking distinct patches of plumose setae. Among the various genera of Pseudomethocini, *Silvorientilla* is unique most notably in female T1 shape and male genitalia, as mentioned in the diagnosis above.

There are numerous parallels between females of *Silvorientilla* and the genus *Ascetotilla* Brothers, 1971 from New Guinea. Most broadly, the undefined pygidium, likely associated with attacking arboreal hosts, is shared by these and many other genera around the world. Additionally, the subquadrate head and densely setose mesosomal pleurae are traits shared by these and some other genera. Most narrowly, the disciform T1 that is armed dorsally with one or more teeth is rare in mutillids. Additionally, both genera are apparently restricted to humid forests. Perhaps coincidentally, both genera are rare in collections and known from few specimens. In *Ascetotilla*, seven of the eight species are known from five or fewer specimens (Brothers, 1971). Males of these genera, however, differ greatly in the structure of the mandible, clypeus, axilla, and genitalia. Also, these genera belong to different tribes of the Sphaerophthalminae, as *Ascetotilla* was placed in the Dasymutillini and *Silvorientilla* belongs to the Pseudomethocini (Brothers and Lelej, 2017). The similarities in female morphology are likely driven by convergence for fitness in humid forest habitats, though the specific utility of the T1 morphology remains a mystery.

Females of four of these species were included in a study on Müllerian mimicry in North America (Wilson *et al.*, 2015). Dorsal habitus photos were included for these species in the unpublished supplemental information files, where they were treated as members of the genus *Pseudomethoca*. Two of these, *S. separata* and *S. bonus* belonged to the Black-headed *Timulla* Ring and the other two, *S. philobeddoe* and *S. sinenomine*, belonged to the Tropical Ring. Two of the species described here were not included in Wilson *et al.* (2015), but they clearly participate in this mimicry complex. *Silvorientilla dasylymatos* belongs to the Tropical Ring and *S.*

incondinatus belongs to the Black-headed *Timulla* Ring.

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