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Notes on South American stingless bees of the genus *Scaptotrigona* (Hymenoptera: Apidae), Part III: A revised infrageneric classification and new species

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Abstract. This is the third part of a series on various taxonomic matters regarding the Neotropical stingless bee genus *Scaptotrigona* Moure (Apinae: Meliponini). Here, an infrageneric classification is established, with *Sakagamilla* Moure resurrected for the *tubiba* group, while *Scaptotrigona* Moure, *s.str*., encompasses the *postica* group. A key to subgenera is presented and five new subgenera are established: ***Eoscaptotrigona*** Engel, new subgenus; ***Dasytrigona*** Engel, new subgenus; ***Gymnotrigona*** Engel, new subgenus; ***Baryorygma*** Engel, new subgenus; and ***Astegotrigona*** Engel, new subgenus. The former *bipunctata* species group is considered to embody two unrelated groups and species of the *luteipennis* group also belong among these. Six new species are described, two of which would have formerly been included in the *bipunctata* group, and the remainder belong to the *depilis* group: ***Scaptotrigona* (*Eoscaptotrigona*) *totobi*** Engel, new species, from Venezuela and Colombia; ***S.* (*Gymnotrigona*) *psile*** Engel, new species, from Venezuela; ***S.* (*Gymnotrigona*) *aurantipes*** Engel, new species, from Venezuela; ***S.* (*Gymnotrigona*) *nuda*** Engel, new species, from Bolivia; ***S.* (*Gymnotrigona*) *stipula*** Engel, new species, from Brazil; ***S.* (*Baryorygma*) *fimbriata*** Engel, new species, from Bolivia.

INTRODUCTION

The present contribution expands on the first two parts of this series concerning outstanding taxonomic matters among South American species of *Scaptotrigona* Moure. This part provides a revised infrageneric classification over that presented in part I (Engel, 2022a). In the intervening ten months since part I was accepted (although appearing in print only a short while ago, the work for part I represents ef-

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forts undertaken well over a year ago), I've had the opportunity to examine nearly a thousand further specimens from across all of the informal assemblages and am now convinced of a meaningful arrangement of what I believe to be natural groups within the genus. In particular, the former *postica*, *tubiba*, *depilis*, and *mexicana* species groups all appear to be natural, while the *bipunctata* and *luteipennis* species groups were assuredly polyphyletic and are herein abandoned. In addition, *Scaptotrigona fulvicutis* (Moure) was unplaced in the aforementioned system but is taken into account herein. In addition, new species are described in order to permit the inclusion of keys to species for three of the subgenera. A table listing all species and their subgeneric assignments is appended (Appendix).

MATERIAL AND METHODS

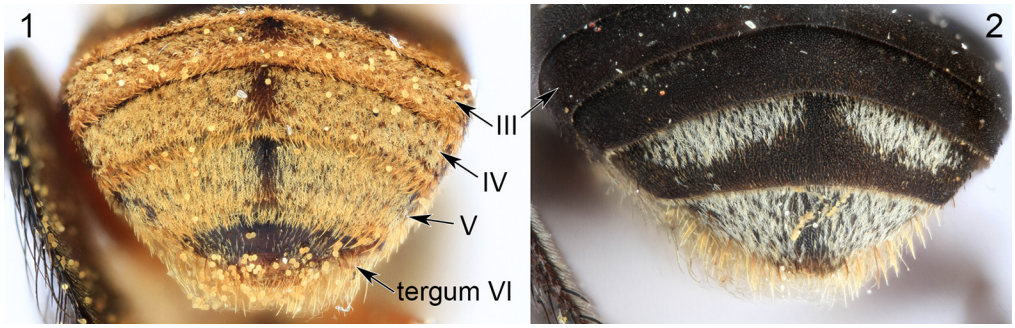
The methods, morphological terminology, symbols, metrics, and images all follow Engel (2022a, 2022b), as well as Engel *et al*. (2021), and the reader is directed to these sources for an elaboration of details. All of the type material of the new species reported here is deposited in the Division of Entomology (Snow Entomological Collection), University of Kansas Natural History Museum, Lawrence, Kansas, USA (SEMC) (M.S. Engel, curator).

SYSTEMATICS

Genus *Scaptotrigona* Moure

An arrangement is established herein that reclassifies some of the previously outlined species groups as subgenera. As noted above, the *bipunctata* and *luteipennis* groups (*sensu* Engel, 2022a) are abandoned, some of their species moved to other groups, and the remainder classified as a subgenus. It is hoped that this arrangement might make it easier for others working on the biology of these bees to identify the taxa they are exploring, but greatly narrowing the available options.

The analysis of Roubik *et al*. (1997) indicated a sister-group relationship between *Scaptotrigona* and *Meliwillea* Roubik *et al*., based on the presence of tomentum on the metasomal terga and the occurrence of wavy setae on the sterna. The elongate, wavy, metasomal setae are abundant in *Scaptotrigona*, while in *Meliwillea* they are certainly present but not to the same degree as in the former. The tomentum present in *Meliwillea* is not at all like that of the *postica* group (*i.e*., *Scaptotrigona s.str*. as treated herein), where the tomentum is yellowish and densely covers metasomal terga III–V. Instead, in *Meliwillea* the white to off-white tomentum is diffuse and, when not worn, is to be found more laterally on terga V and VI. This condition is best approximated by species of the subgenera *Eoscaptotrigona* and to some degree *Baryorygma*, and is likely plesiomorphic for *Scaptotrigona s.l*. Assuming for the moment that the combination of diffuse tomentum on terga IV–VI and scattered, short, suberect, metasomal bristles of *Eoscaptotrigona* are symplesiomorphic with those found in *Meliwillea*, then I would hazard to assert that the distribution of characters among other *Scaptotrigona* tends to suggest the following working hypothesis of relationships: *Eoscaptotrigona* + [*Sakagamilla* + {*Dasytrigona* + *Gymnotrigona* + (*Astegotrigona* + *Baryorygma* + *Scaptotrigona*)}]. Naturally, an extensive analysis is needed to determine whether such an initial hypothesis accords with a broad array of character data, and so I would not presume that the aforementioned ordering is anything other than informed speculation.



Figures 1–2. Dorsoapical views of metasomata of *Scaptotrigona* Moure. **1.** *Scaptotrigona* (*Scaptotrigona*) *ederi* Engel. **2.** *S.* (*Sakagamilla*) *tubiba* (Smith).

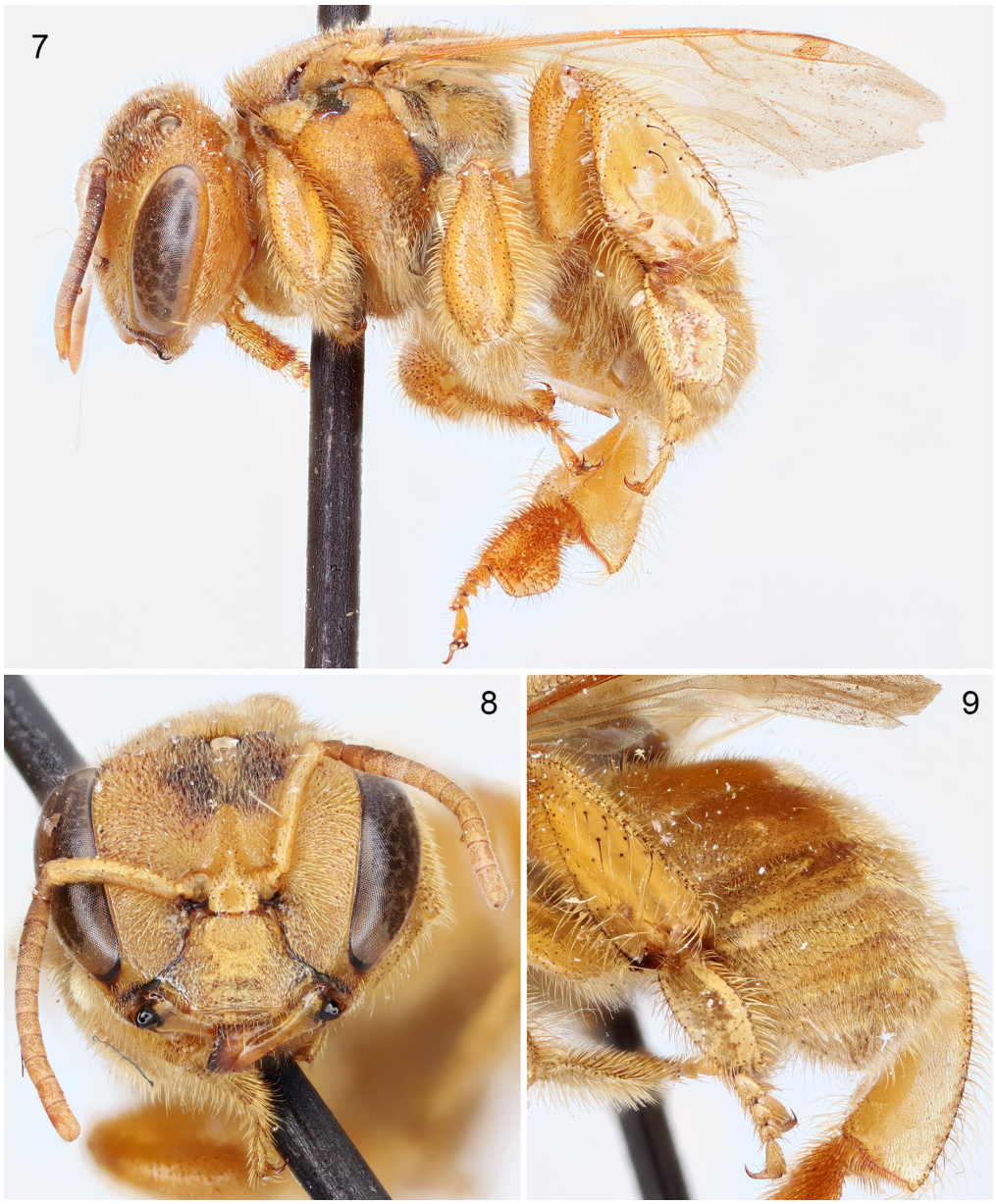
Key to Subgenera of *Scaptotrigona*
(worker caste only)

1. Bristles of vertex, mesoscutum, and mesoscutellum long, distinctly longer than median ocellar diameter (Engel, 2002a: fig. 1) 2
—. Bristles of vertex, mesoscutum, and mesoscutellum short, distinctly shorter than median ocellar diameter (Engel, 2002a: fig. 2) ..... *Sakagamilla* Moure
2(1). Scape and supraclypeal area without minute, erect to suberect bristles, at most sometimes with one or two bristles at extreme base of scape, otherwise setation minute and appressed (Figs. 4–6); tergal setation not as below; integumental coloration variable 3
—. Scape along its length and supraclypeal area with numerous, minute, erect to suberect bristles (Fig. 3); all metasomal terga with dense, long, fine, erect, simple, yellow setae intermixed with similar short, appressed to decumbent setae (Fig. 9); integument wholly yellow orange to orange (Figs. 7–9) .... *Dasytrigona*, n. subgen.
3(2). Discs of metasomal terga III–V with abundant, prominent, erect to subdecumbent, bristles, such bristles frequently, but not universally, arising amid dense tomentum 4
—. Discs of metasomal terga III–V without bristles, instead with only fine, short to minute setae, such setae typically appressed to decumbent, if bristles present, then short (less than one-half ocellar diameter) and confined to lateral margins or rarely sparse over disc and not associated with tomentum 6
4(3). Metasomal terga III–V not covered in yellow tomentum, at most with diffuse areas of whitish or yellowish tomentum laterally on discs of terga IV–VI (*e.g.*, Fig. 2) [care should be taken as sometimes the tomentum is difficult to see or may be largely rubbed off and only present in small lateral areas or under the margin of the preceding tergum] 5
—. Metasomal terga III–V covered with dense, yellow, plumose tomentum, typically obscuring integument (Fig. 1) [except in *S. faviziae* Engel tomentum interrupted broadly medially, and largely missing on tergum III] .... *Scaptotrigona* Moure, *s.str.*
5(4). Face below tangent of antennal toruli with a large vitreous yellow, yellowish brown, yellow patch (Figs. 37, 38, 40), clypeus not concolorous with frons; upper frons with minute punctures well-spaced, separated by 1–2× a puncture width ..... *Baryorygma*, n. subgen.

Figures 3–6. Scapes of *Scaptotrigona* Moure. **3.** *Scaptotrigona* (*Dasytrigona*) *fulvicutis* Moure. **4.** *S.* (*Gymnotrigona*) *guimaraesensis* Laroca & Almeida. **5.** *S.* (*Scaptotrigona*) *magdalenae* Engel. **6.** *S.* (*S.*) *gonzalezi* Engel.

—. Face below tangent of antennal toruli brown to dark brown, largely concolorous with remainder of head (Fig. 14), clypeus brown or concolorous with frons; upper frons with minute punctures dense, separated by much less than a puncture width, nearly contiguous in some places ..... *Eoscaptotrigona*, n. subgen.

6(3). Metasomal terga III–V finely imbricate, somewhat shining, with scattered punctures; mesoscutellum short, broadly rounded apically, apex extending



Figures 7–9. Worker of *Scaptotrigona* (*Dasytrigona*) *fulvicutis* (Moure). **7.** Lateral habitus. **8.** Facial view. **9.** Posterolateral view of metasomal dorsum.

only to basal margin of propodeum, not overhanging propodeum (Fig. 11) .. .. *Astegotrigona*, n. subgen.

—. Metasomal terga III–V coarsely imbricate to densely punctate; mesoscutellum long, apex somewhat blunt medioapically, apex extending well past basal margin of propodeum and thus overhanging propodeum (Fig. 10) .... *Gymnotrigona*, n. subgen.

Figures 10–11. Mesosomal dorsa of *Scaptotrigona* Moure. **10.** *Scaptotrigona* (*Gymnotrigona*) *hellwegeri* (Friese). **11.** *S.* (*Astegotrigona*) *wheeleri* (Cockerell).

Eoscaptotrigona Engel, new subgenus
ZooBank: urn:lsid:zoobank.org:act:B6F91957-560A-482F-AE57-6267380305EC

TYPE SPECIES: *Scaptotrigona bipunctata polysticta* Moure, 1950.

DIAGNOSIS: This subgenus can be characterized by the following combination of traits: integument largely black; bristles of vertex and mesoscutum longer than median ocellar diameter; scape and supraclypeal area without abundant minute, erect to suberect bristles; face below tangent of antennal toruli chestnut brown to dark brown, largely concolorous with the remainder of the head, although sometimes lighter than black of frons; clypeus brown or concolorous with frons; upper frons with dense, minute punctures, such punctures separated by much less than a puncture width and nearly contiguous in some places; discs of metasomal terga III–V with abundant, prominent, erect to subdecumbent, bristles; metasomal terga III–V lacking dense yellow tomentum, but instead typically with diffuse areas of whitish tomentum laterally on discs of terga IV–VI, although these sometimes worn. The subgenus is superficially similar to *Baryorygma* (*vide infra*), but differs in the absence of vitreous yellow to yellow facial markings, and the dense punctation of the frons (punctures separated by 1–2× a puncture width in *Baryorygma*). *Eoscaptotrigona* occurs from Nicaragua to southern Brazil, Bolivia, and southern Peru.

ETYMOLOGY: The new name is a combination of the Ancient Greek Ēṓs (Ἠώς, goddess of the dawn, and generally meaning, "early", as an allusion to these as putatively the earliest-diverging *Scaptotrigona*) and *Scaptotrigona*. The gender of the name is feminine.

Key to Species of *Eoscaptotrigona*

1. Metasomal tergum I without erect, black bristles apicolaterally on dorsal-facing surface; wings orange fuscous 2
—. Metasomal tergum I with minute, erect, black bristles apicolaterally on dorsal-facing surface; wings infumate [Venezuela, Colombia] ..... *S. totobi*, n. sp.
2(1). Suberect to subdecumbent, black bristles abundant on metasomal terga III–VI [Panama, Costa Rica, Nicaragua] ..... *S. luteipennis* (Friese)
—. Suberect to subdecumbent, black bristles abundant on metasomal terga IV–VI, those of tergum III noticeably shorter and somewhat sparser than those of succeeding terga [Bolivia, Brazil, Peru] ..... *S. polysticta* Moure

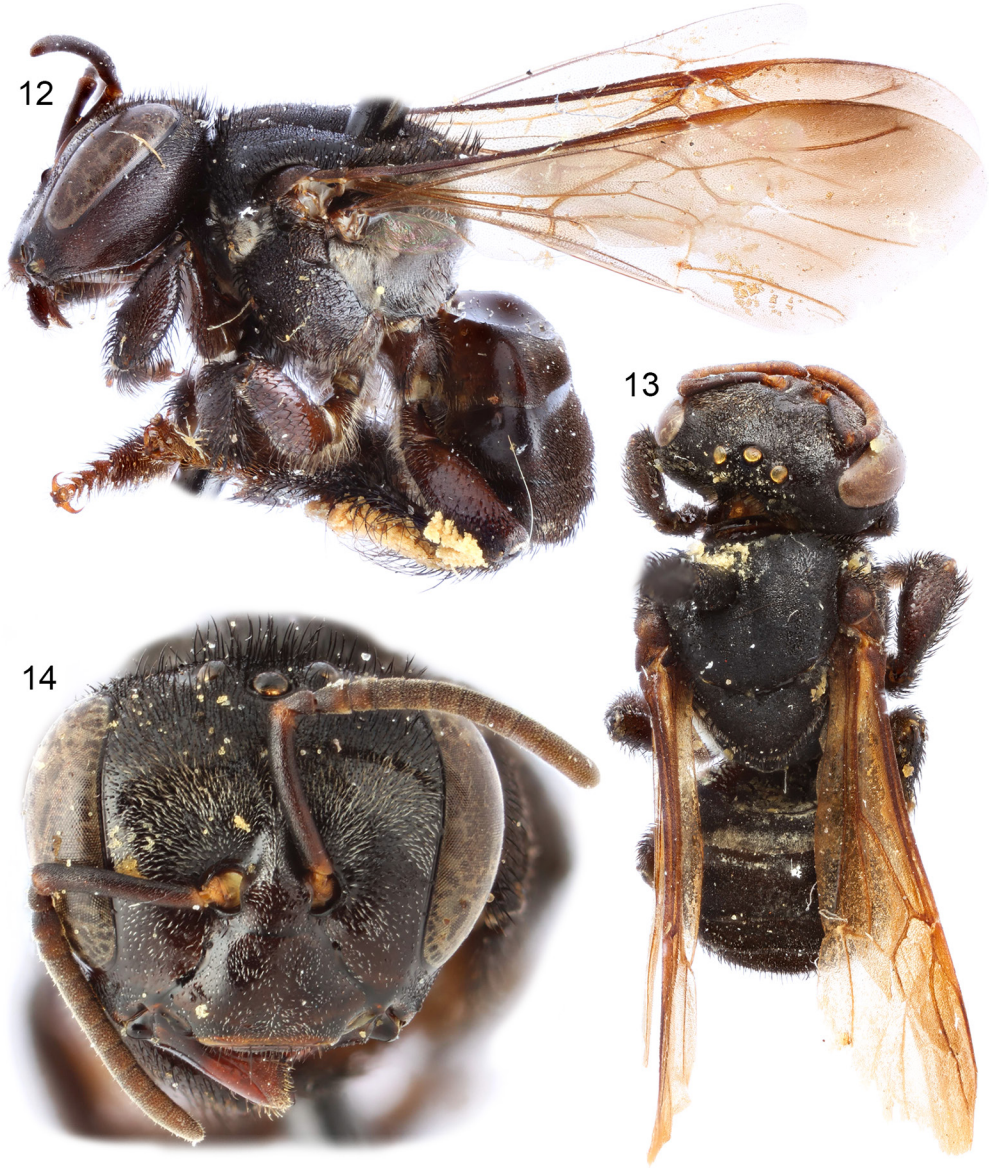
Scaptotrigona* (*Eoscaptotrigona*) *totobi Engel, new species
ZooBank: urn:lsid:zoobank.org:act:4D4E0571-A552-4261-A680-4A42F1156F42
(Figs. 12–18)

Diagnosis: This species stands out from others in *Eoscaptotrigona* owing the presence of minute, erect, black bristles apicolaterally on the dorsal-facing surface of tergum I [absent in *S. polysticta* Moure and *S. luteipennis* (Friese)] and the infumate rather than orange fuscous wings. The new species occurs in Venezuela and Colombia, whereas *S. polysticta* is known from further south in eastern Peru, Brazil, and Bolivia, while *S. luteipennis* is found in Central America.

Description: ♀: Total body length approximately 6.5–7.0 mm, forewing length (to base of humeral sclerite) 6.0–6.5 mm. Head wider than long, width 2.85–2.94 mm, length 2.21–2.33 mm; compound eye length 1.58–1.70 mm; upper interorbital distance 1.82–1.88 mm, lower interorbital distance 1.76–1.79 mm. Scape length 1.06–1.09 mm, slightly longer than torulocellar distance, torulocellar distance 0.94–1.03 mm. Clypeus approximately 1.59–1.66× as wide as long, length 0.73–0.82 mm, width 1.21–1.30 mm. Malar area long, length 1.85–2× flagellar diameter. Preoccipital carina strong, lamellate dorsally and bordered by deep medial and lateral indentations, carina interrupted laterally by deep concavity, preoccipital lamella extends into concavity at least half length, lower margin of concavity rounded, not projecting upward as distinct lamellate tooth.

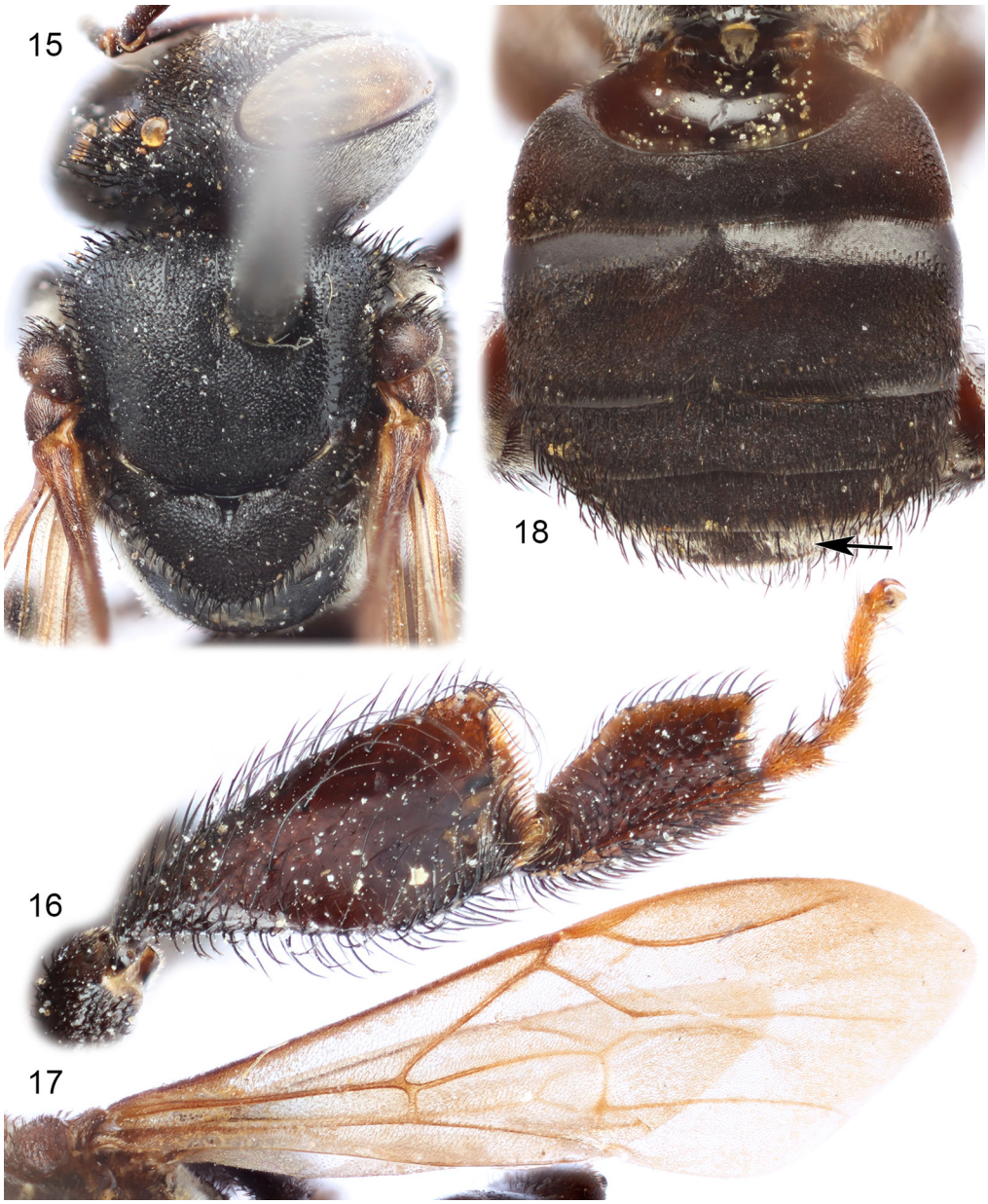
Integument generally black to dark brown, with areas of dark brown sometimes nearly black; labiomaxillary complex dark brown; labrum dark brown; mandible dark brown; clypeus dark brown; supraclypeal area dark brown; malar space dark brown to black; face below tangent of antennal toruli dark brown; scape dark brown to black; pedicel and flagellum dark brown; remainder of face black; vertex and posterior of head black; gena dark brown; postgena dark brown; hypostomal borders light brown. Mesosoma black; tegula dark brown; legs dark brown. Wing membranes infumate; veins dark brown to brown. Metasoma dark brown to black.

Integument smooth and shining amid punctures; clypeus with small shallow punctures separated by less than a puncture width, nearly contiguous in most areas; supraclypeal area with similar punctures except separated by up to a puncture width, but typically less; lower face with small shallow punctures contiguous along inner orbit blending to more minute and sparse punctures toward epistomal sulcus and antennal torulus; such punctures becoming minute and separated by a puncture width or less on frons; ocellocular area and upper frons with punctures slightly larger, well defined, and separated by less than a puncture width; punctures of vertex ill-defined



Figures 12–14. Worker of *Scaptotrigona* (*Eoscaptotrigona*) *totobi*, new species. **12.** Lateral habitus. **13.** Dorsal habitus. **14.** Facial view.

and blending to coarsely imbricate integument; posterior of head coarsely imbricate; gena with punctures similar to upper frons; postgena nearly impunctate. Mesoscutum and mesoscutellum with small contiguous punctures, integument between punctures, where evident, smooth; pleura with small contiguous punctures, punctures becoming weaker and more spaced ventrally and posteroventrally; punctures of metepisternum smaller and more distinct than those of mesepisternum; propodeum with small contiguous punctures on lateral surface; basal area of propodeum tessellate. Metasomal terga coarsely imbricate and minutely punctate, except anterior-facing surface of tergum I smooth, pregradular areas and exceptionally narrow apical marginal zones



Figures 15–18. Worker of *Scaptotrigona* (*Eoscaptotrigona*) *totobi*, new species. **15.** Mesosomal dorsum. **16.** Prolateral surface of metatibia, metatarsus, and metapretarsus. **17.** Forewing. **18.** Metasomal dorsum.

finely imbricate and impunctate; tergum VI imbricate and largely impunctate; sterna finely imbricate.

Fine pubescence generally consisting of sparse, minute, appressed or decumbent white or off-white setae (sometimes tinged slightly yellowish), such minute setae often simple but sometimes plumose, intermixed in places with black setae; minute white setae sparse on lower face, more numerous on frons except upper frons such setae blending to more fuscous setae and erect black, largely simple, setae and bristles; gena

with scattered white setae similar to that of face (in resinous specimens these setae appressed and darkened, and therefore difficult to observe); postgena with elongate, erect, black to dark fuscous setae. Pronotal lobe with dense, white, plumose setae; mesoscutum and mesoscutellum with scattered, minute, simple, subappressed to decumbent, fuscous setae; metanotum with abundant, white, plumose setae; mesepisternum with similar setae to that of mesoscutum, such setae blending ventrally to sparse white, plumose setae and longer, more similar white to off white setae; metepisternum with dense, white, plumose setae; propodeum lateral surface with similar setae to that of metepisternum. Legs with largely black setae, except coxae, trochanters, and proximally on femora long, white to fuscous setae. Metasomal terga with minute, appressed to decumbent, simple, fuscous setae (such setae most easily viewed obliquely or in profile), except anterior-facing surface of tergum I glabrous, terga V and VI with white, plumose tomentum, in lateral patches on tergum V and scattered on tergum VI, such tomentum sometimes present as small patches laterally on tergum IV (seemingly rubbed off in other specimens); sterna with elongate, erect, white to off-white simple scopal setae, such setae with wavy apices. Black bristles (thick, typically erect, often simple or with minute pectinate branches apically) in distinct areas of body as follows: Labrum with some erect, simple bristles; upper frons and vertex with black bristles, those of vertex longest, particularly medially posterior to ocelli; black bristles along anterior margin of pronotal lobe; mesoscutum anterior and lateral margins with abundant black bristles and some sparsely scattered on disc; tegula with suberect black bristles anteriorly; mesoscutellum with black bristles abundant, particularly along posterior margin, bristles longest along margin; black bristles scattered over mesepisternum and a distinct line of such bristles along rounded margin with preëpisternum; legs with numerous black bristles, those of distitarsomeres typically fulvous; metatibial and metabasitarsal bristles black. Metasoma terga III–V with abundant, suberect to subdecumbent black bristles, similar bristles longer and more erect on tergum VI; tergum II with such bristles short and present apically; tergum I with such bristles short and present only laterally.

♀: *Latet*.

♂: *Latet*.

HOLOTYPE: ♀, Venezuela: Bolivar, Rancho Las Nieves, 6°20′N, 66°50′W, 500 m, 5–7 February 1990, C.D. Michener (SEMC).

PARATYPES: 2♀♀, Venezuela: Bolivar, Rancho Las Nieves, 6°20′N, 66°50′W, 500 m, 5–7 February 1990, C.D. Michener (SEMC); 1♀, Colombia: Meta, San Juan de Arama, Reserva La Macarena, 6 December 1986, A. Bonilla (SEMC).

ADDITIONAL MATERIAL: 5♀♀, Venezuela: Barinas, 28 km NW Barinitas, July 18, 1974, O.R. Taylor (SEMC).

ETYMOLOGY: The specific epithet is taken from the Yanomami Indian name for the species, *totobi*.

Subgenus *Sakagamilla* Moure

Sakagamilla Moure, 1989: 681. Type species: *Sakagamilla affabra* Moure, 1989, by original designation.

Although originally proposed for only that species with yellow maculation along the mesoscutal lateral borders and on the axillae, this group was expanded to include all of those characteristically short-bristled taxa (Engel, 2022a). An account of the sub-

genus, as the *tubiba* species group, was recently provided by Engel (2022a), and is therefore not repeated here. A key to the species, excluding *S. marialiceae* Laroca & Almeida, was provided by Engel (2022a).

Dasytrigona Engel, new subgenus
ZooBank: urn:lsid:zoobank.org:act:21C3FC60-CDF0-495C-B90A-4DE856624D86

Type species: *Nannotrigona* (*Scaptotrigona*) *fulvicutis* Moure, 1964.

Diagnosis: This is the most distinctive of all the species of *Scaptotrigona* owing to its uniquely shaggy metasoma (Fig. 9), in which the terga are covered with dense, long, fine, erect, yellow setae intermixed with similar short, appressed setae. In addition, the scape has numerous minute, erect to suberect bristles along its length, and the supraclypeal area is also beset with similar bristles (Fig. 3). Aside from these unique apomorphies, the subgenus also has the integument entirely yellow orange to orange, has bristles on the vertex and mesoscutum longer than a median ocellar diameter, and lacks tomentum on metasomal terga III–V. The subgenus includes only the type species from northern Brazil.

Etymology: The new subgeneric name is a combination of Ancient Greek adjective δᾰσῠ́ς (*dasús*, meaning, "shaggy") and *Trigona* Jurine. The gender of the name is feminine.

Gymnotrigona Engel, new subgenus
ZooBank: urn:lsid:zoobank.org:act:8055F509-DEC5-4711-8862-1553268A0831

Type species: *Trigona* (*Scaptotrigona*) *depilis* Moure, 1942.

Diagnosis: Like *Astegotrigona* (*vide infra*), *Gymnotrigona* lacks prominent suberect bristles on the discs of metasomal terga III–V, although sometimes there are some minute (less than 0.5× ocellar diameter), subdecumbent bristles. It differs from *Astegotrigona* in that the mesoscutellum is blunt medially and comparatively long, with the apex extending beyond the basal margin of the propodeum, overhanging the basal third or more of the propodeum (Fig. 10). Additionally, metasomal terga III–V are coarsely imbricate to densely punctate, and more matte. The integument is largely black, but with some vitreous to more well-defined facial markings on the lower face, although in one species the coloration is somewhat lighter overall (*S. stipula*, *vide infra*) and in two there are extensive areas of orange (Figs. 19–24). The subgenus occurs from Mexico to Argentina, but the species are few and not common.

Etymology: The new name is a combination of the Ancient Greek adjective *gumnós* (γυμνός, meaning, "unclad") and *Trigona*. The gender of the name is feminine.

Key to Species of *Gymnotrigona*

1. Head, mesosoma, and legs wholly or nearly entirely dark brown to black (Figs. 30–36; bristles of vertex and mesoscutellum black 2
—. Head, mesosoma, legs, and sometimes metasoma with extensive areas of orange, particularly either mesoscutum or mesoscutellum wholly orange (Figs. 19–24); bristles of vertex and mesoscutellum yellow to fulvous 7
2(1). Apical margins of terga II–V or III–V with fine, minute fimbriae; metasomal terga II–IV with short, subdecumbent to suberect lateral bristles, or without bristles laterally on terga II and III, but a few bristles on terga IV and V 3

Figure 19. Lateral habitus of worker of *Scaptotrigona* (*Gymnotrigona*) *hellwegeri* (Friese).

—. Apical margins of terga II–V without fimbriae; metasomal terga II–IV without lateral bristles 5

3(2). Metasomal terga II and III with minute, sparse, lateral bristles; genal tooth present as acute lamella projecting upward 4

—. Metasomal terga II and III without lateral bristles; genal tooth absent, lower margin of concavity rounded [Venezuela] ..... *S. psile*, n. sp.

4(3). Sparse, minute, decumbent bristles of terga III and IV golden fulvous; mesoscutellum black to dark brown, sometimes with light brown apically; tergum VI without black bristles [Brazil: Matto Grosso, Matto Grosso do Sul, Goiás, Santa Catarina, Paraná, Rio Grande do Sul; Argentina: Misiones; Paraguay] ..... *S. depilis* (Moure)

—. Sparse, minute, decumbent bristles of terga III and IV black; mesoscutellum brownish orange with yellow brown apically; tergum VI with minute, black bristles [Brazil: São Paulo] ..... *S. stipula*, n. sp.

5(2). Bristles of mesoscutal anterior margin long, 0.15–0.30 mm 6

—. Bristles of mesoscutal anterior margin short, approximately 0.05–0.09 mm [Argentina] ..... *S. jujuyensis* (Schrottky)

6(5) Clypeus dark chestnut brown, with apical margin black (Fig. 31); face below level of antennal toruli with yellowish spots bordering upper half of clypeus and lower outer margin of antennal torulus, separated from inner orbits by dark

chestnut brown (Fig. 31); genal tooth present and large [Bolivia] .... *S. nuda*, n. sp.

—. Clypeus largely yellow to brownish yellow (Fig. 32); face below level of antennal toruli yellow to brownish yellow from inner orbit to clypeus, often extending along inner orbit as thin strip above level of antennal toruli by about a torular diameter (Fig. 32); genal tooth absent to scarcely a short, rounded protuberance [Brazil: Rondônia, Goiás, Matto Grosso] ... *S. guiamaraesensis* Laroca & Almeida

7(1). Mesoscutum largely orange, with thin longitudinal black stripes on either side of midline (Fig. 10); mesoscutellum dark brown to black (Fig. 10); tegula largely dark brown, lighter posteriorly (Fig. 10); metasoma typically with extensive orange markings (Fig. 19) [Mexico] ..... *S. hellwegeri* (Friese)

—. Mesoscutum black (Fig. 21); mesoscutellum orange (Fig. 21); tegula orange (Fig. 21); metasoma without orange markings (Figs. 20, 21) [Venezuela] .... *S. aurantipes*, n. sp.

Scaptotrigona* (*Gymnotrigona*) *aurantipes Engel, new species

ZooBank: urn:lsid:zoobank.org:act:533E0BA4-0AFE-458A-8E96-869B3087A5CA

(Figs. 20–29)

Diagnosis: This species is superficially similar to *S. hellwegeri* (Friese) owing to the extensive yellow to orange markings, rather than the other species of the subgenus in which the integument is almost wholly dark brown to black. *Scaptotrigona aurantipes* can be most readily distinguished from *S. hellwegeri* (Fig. 19) by the reversal of coloration: in *S. aurantipes* the mesoscutum black (versus orange in *S. hellwegeri*), the mesoscutellum is orange (versus black in *S. hellwegeri*), the tegula is orange (versus dark brown in *S. hellwegeri*), and the metasoma lacks orange markings. Like most species of *Gymnotrigona*, metasomal terga II–V have minute fimbriae (absent in three of the species: *vide* Key, *supra*).

Description: As described for *S. totobi* (*vide supra*) except as follows: ♀: Total body length approximately 5.6–6.0, forewing length (to base of humeral sclerite) 5.6–5.9 mm. Head wider than long, width 2.42–2.55 mm, length 1.94–1.97 mm; compound eye length 1.39–1.42 mm; upper interorbital distance 1.58–1.67 mm, lower interorbital distance 1.45–1.52 mm. Scape length 0.91–0.94 mm, slightly longer than torulocellar distance, torulocellar distance 0.85–0.88 mm. Clypeus approximately 1.7–1.8× as wide as long, length 0.61–0.64 mm, width 1.15–1.21 mm. Malar area 1.6× flagellar diameter. Preoccipital carina strong, lamellate dorsally and bordered by deep medial and lateral indentations, carina interrupted laterally by shallow concavity, preoccipital lamella scarcely extending into concavity, lower margin of concavity rounded, not projecting upward as tooth.

Integument generally dark brown to black except with extensive areas of orange as follows: clypeus and supraclypeal area yellow orange to orange except typically fading to brown in apicolateral corners of clypeus; face below tangent of antennal toruli and malar space yellow orange to orange; scape yellow orange to orange, typically with some brown dorsoapically; flagellum brown except orange beneath; face of antennal toruli largely dark brown to black except with triangular area of yellow orange to orange beneath sloping to inner orbit of compound eye and fading to reddish brown or brown before dark brown to black on frons; majority of gena and postgena yellow orange to orange, yellow bordering hypostomal fossa; pronotum yellow orange; mesoscutellum reddish orange to orange; tegula orange and semi-translucent; posterior half of mesepisternum orange except sometimes with reddish brown spot

medially in posterior section; propodeum sometimes with patch of orange on lateral surface; legs largely yellow brown to orange, with areas of brown to dark brown on femora and prolateral surface of metatibia; metasomal terga largely dark brown except reddish brown on anterior-facing surface of tergum I and sometimes brown to reddish brown apically on apical margins of terga II–V; sterna dark brown with lighter, semi-translucent apical margins.

Integument smooth and shining amid punctures; clypeus with small shallow punctures separated by a puncture width or less; supraclypeal area as on clypeus; lower face with small shallow punctures as on clypeus along inner orbit blending to sparse toward epistomal sulcus and antennal torulus; punctures on frons separated by less than a puncture width, punctures more minute and separated by 1–2× a puncture width in ocellocular area; punctures of vertex ill-defined and blending to coarsely imbricate integument; posterior of head coarsely imbricate; gena with punctures similar to frons; postgena nearly impunctate. Mesoscutum and mesoscutellum with small contiguous punctures; pleura with coarse, irregular, contiguous punctures, punctures slightly weaker ventrally; punctures of metepisternum smaller and more distinct than those of mesepisternum; propodeum with small contiguous punctures on lateral surface; basal area of propodeum tessellate. Metasomal terga coarsely imbricate, except anterior-facing surface of tergum I smooth, apical marginal zones virtually absent; tergum VI finely imbricate, largely impunctate, shining; sterna finely imbricate.

Fine pubescence generally consisting of sparse, minute, appressed or decumbent yellow to off white setae, such minute setae often simple but sometimes plumose. Pronotal lobe with dense, yellow, plumose setae; mesoscutum and mesoscutellum with scattered, minute, simple, yellow to slightly fulvous setae; metanotum with abundant, yellow to off-white, plumose setae; mesepisternum with similar setae to that of mesoscutum, such setae blending ventrally to longer setae ventrally; metepisternum with dense, off-white, plumose setae; propodeum lateral surface with similar setae to that of metepisternum. Legs with largely yellow to light fulvous setae. Metasomal terga with scattered, minute, simple, decumbent, fulvous setae, such setae more abundant and noticeable on terga IV–VI, and longer on terga V and VI, except anterior-facing surface of tergum I glabrous; terga II–V with apical fimbriae of minute, fine, simple, light fulvous setae; sterna with elongate, erect, simple, yellow scopal setae, such setae with wavy apices. Bristles in distinct areas of body: Labrum with some erect, simple, yellow to fulvous bristles; upper frons and vertex with fulvous bristles, those of vertex longest, particularly medially posterior to ocelli; fulvous bristles along anterior margin of pronotal lobe; mesoscutum anterior and lateral margins with abundant fulvous bristles; tegula with suberect yellow to fulvous bristles anteriorly; mesoscutellum with fulvous bristles, particularly long and abundant along posterior margin; yellow bristles scattered over mesepisternum and a distinct line of fulvous bristles along rounded margin with preëpisternum; legs with largely yellow to light fulvous bristles; corbicular bristles dark fuscous to dark fulvous, metatibial fringe bristles fulvous; metabasitarsus with some fulvous to dark fulvous bristles on margins and a few finer such bristles on prolateral surface. Metasoma terga I–V without bristles on discs; terga I and II without bristles laterally; terga II–V with minute to short, subdecumbent to suberect, fulvous bristles laterally; tergum VI with such bristles sparse on disc, but more numerous long, erect, fulvous bristles laterally and along margin.

♀: *Latet*.

♂: As described for worker except as follows: Total body length approximately 6.1–6.4 mm, forewing length (to base of humeral sclerite) 5.5–5.6 mm. Head wider

Figures 20–22. Worker of *Scaptotrigona* (*Gymnotrigona*) *aurantipes*, new species. **20.** Lateral habitus. **21.** Dorsal habitus. **22.** Facial view.

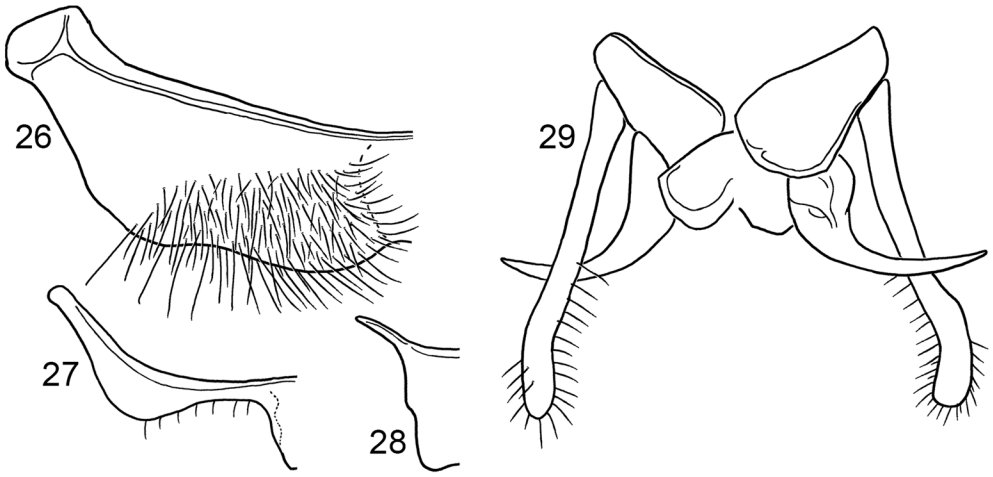
than long, width 2.27–2.30 mm, length 1.88–1.91 mm; compound eye length 1.52 mm; upper interorbital distance 1.36–1.39 mm, lower interorbital distance 1.00–1.03 mm. Scape length 0.64–0.67 mm, much shorter than torulocellar distance, torulocellar distance 0.76 mm. Clypeus approximately 1.7× as wide as long, length 0.58 mm, width 0.97–1.00 mm. Malar area 0.6× flagellar diameter. Gena narrower than compound eye. Preoccipital ridge carinate dorsally, sharply angled at best laterally, without concavity or bordering indentations. Terminalia in figures 26–29.

Face below tangent of antennal toruli yellow to orange, remainder of face black; vertex, posterior of head, and majority of gena black, lower gena near malar space

Figures 23–25. Drone of *Scaptotrigona* (*Gymnotrigona*) *aurantipes*, new species. **23.** Lateral habitus. **24.** Facial view. **25.** Dorsal habitus.

orange; postgena reddish orange anteriorly, black posteriorly; scape yellow to yellow orange; pedicel and flagellum orange beneath, narrowly light brown above. Mesosoma black except pronotum yellow orange to orange; tegula wholly orange and semi-translucent. Legs entirely yellow to yellow orange. Metasomal terga dark brown except ventral-facing lateral surfaces yellow to yellow brown, anterior-facing surface of tergum I yellow brown, tergum VII apically yellow; sterna largely yellow to yellow brown.

Appressed, simple, short setae of mesoscutum more abundant and longer than in worker, more fulvous; sterna without scopal setae as in worker but with dense, sub-



Figures 26–29. Male terminalia of *Scaptotrigona* (*Gymnotrigona*) *aurantipes*, new species. **26.** Sternum VI. **27.** Sternum VII. **28.** Sternum VIII. **29.** Genital capsule, left side dorsal view, right side ventral view.

decumbent to decumbent, mesial-posteriorly directed, simple, elongate, yellow setae. Bristles as follow: bristles of drone generally more elongate than those of worker. Legs with abundant yellow to light fulvous bristles except numerous, thin, black bristles intermixed on prolateral surface of metatibia.

Holotype: ♀, Venezuela: Aragua, Rancho Grande Biol. Stn., Portachuelo Pass, 10°21′0′′N, 67°41′0′′W, 1100 m, 4 Jun 1998, J. Ashe, R. Brooks, R. Hanley, ex: insects moving thru pass against wind-migration (SEMC).

Paratypes: 1♀, 2♂♂, Venezuela: Aragua, Rancho Grande Biol. Stn., Portachuelo Pass, 10°21′0′′N, 67°41′0′′W, 1100 m, 4 Jun 1998, J. Ashe, R. Brooks, R. Hanley, ex: insects moving thru pass against wind-migration (SEMC); 1♀, Venezuela: Aragua, El Pao de Zarate Carreteria, Guacomayo, 900 m, May 1977; 1♀, Venezuela: Estación Biol. de los Llanos, Calabozo Ed. Guárico, 25 July 1987, N. Ramirez, ex: flowers of *Croton* [Euphorbiaceae: Crotonoideae: *Croton* L.] (SEMC); 1♀, Venezuela: Suroeste del Valle de Caracas, Edo. Miranda, Bosque deciduo secundario, 10°30′N, 66°53′W, 110 m.s.n.m., N. Ramirez, visita flores de *Mimosa* [Fabaceae: Caesalpinioideae: *Mimosa* L.] (SEMC); 1♀, Venezuela: Suroeste del Valle de Caracas, Edo. Miranda, Bosque deciduo secundario, 10°30′N, 66°53′W, 110 m.s.n.m., N. Ramirez, visita flores de *Croton scaber* [Euphorbiaceae: Crotonoideae: *Croton scaber* Willd.] (SEMC).

Etymology: The specific epithet is a combination of the Latin adjective *aurantius* (meaning, "orange") and noun *pēs* (meaning, "foot").

Scaptotrigona* (*Gymnotrigona*) *psile Engel, new species
ZooBank: urn:lsid:zoobank.org:act:3CCE4850-7696-4350-9EC2-B4FCF68C3367
(Figs. 30, 31)

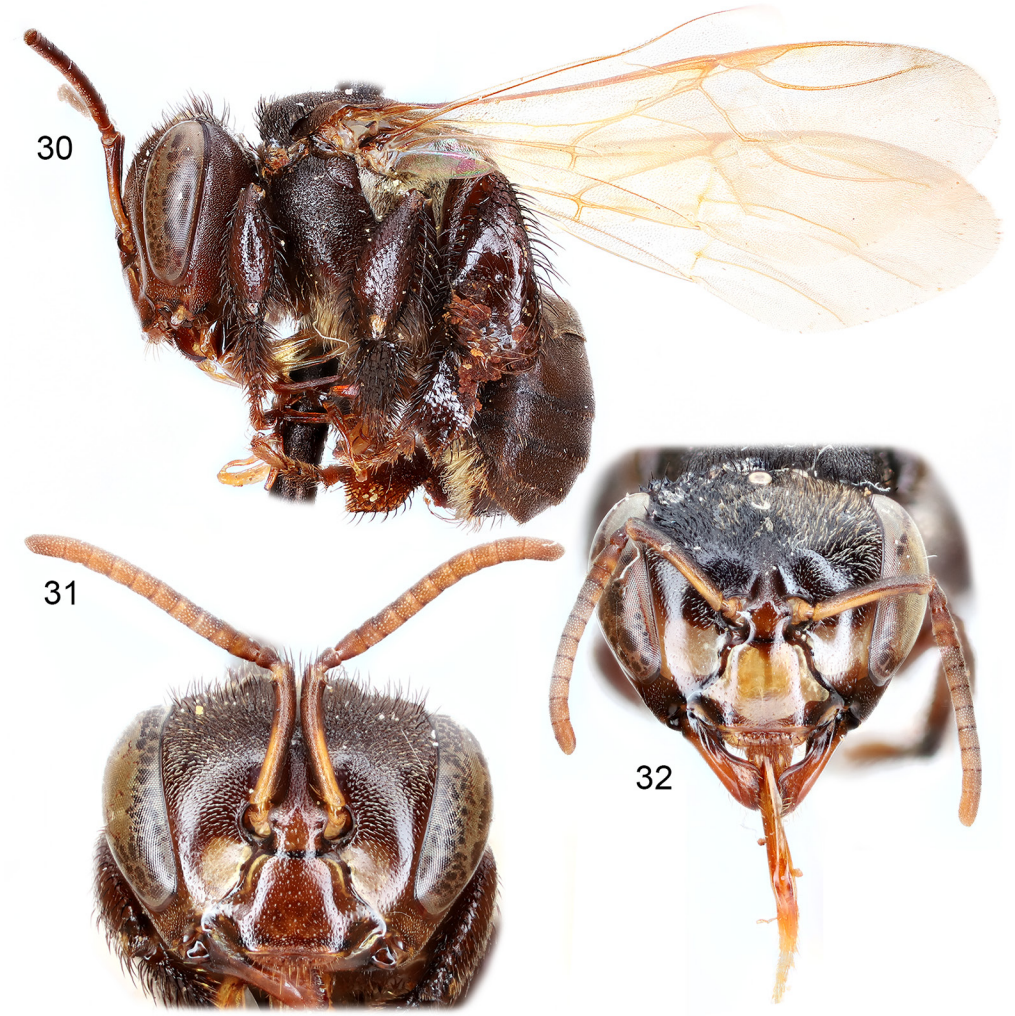
Diagnosis: This species is superficially similar to *S. aurantipes* but differs in the absence of extensive orange markings and presence of black bristles on the vertex and mesoscutum. From other species with minute tergal fimbriae and dark body coloration, *S. psile* can be distinguished by the absence of a genal tooth and the complete absence of lateral bristles on metasomal terga II and III.

DESCRIPTION: As described for *S. totobi* (*vide supra*) except as follows: ♀: Total body length approximately 5.4–5.9, forewing length (to base of humeral sclerite) 5.5–5.8 mm. Head wider than long, width 2.42–2.45 mm, length 2.00–2.03 mm; compound eye length 1.39–1.42 mm; upper interorbital distance 1.58–1.61 mm, lower interorbital distance 1.45–1.48 mm. Scape length 0.91 mm, slightly longer than torulocellar distance, torulocellar distance 0.85–0.88 mm. Clypeus approximately 1.6–1.7× as wide as long, length 0.58–0.64 mm, width 1.03 mm. Malar area long, length approximately 1.6× flagellar diameter. Preoccipital carina strong, lamellate dorsally and bordered by deep medial and lateral indentations, carina interrupted laterally by deep concavity, preoccipital lamella not extending into concavity, lower margin of concavity rounded, not projecting upward as tooth.

Integument generally black to dark brown; clypeus and supraclypeal area chestnut brown; face below tangent of antennal toruli chestnut brown along inner orbit, blending to faint yellow or yellow brown by clypeus and lower antennal torulus; malar space chestnut brown; scape dark brown above, light brown to yellow brown ventrally; flagellum dark brown except light brown to orange below; hypostomal borders yellow brown.

Integument smooth and shining amid punctures; clypeus with small shallow punctures separated by a puncture width or less; supraclypeal area as on clypeus; lower face with small shallow punctures as on clypeus along inner orbit blending to sparse toward epistomal sulcus and antennal torulus; such punctures becoming more well defined and separated by a puncture width or less on frons and ocellocular area; punctures of vertex ill-defined and blending to coarsely imbricate integument; posterior of head coarsely imbricate; gena with punctures similar to frons; postgena nearly impunctate. Mesoscutum and mesoscutellum with small contiguous punctures, integument between punctures, where evident, smooth; pleura with small contiguous punctures, punctures slightly weaker ventrally; punctures of metepisternum smaller and more distinct than those of mesepisternum; propodeum with small contiguous punctures on lateral surface; basal area of propodeum tessellate. Metasomal terga coarsely imbricate, except anterior-facing surface of tergum I smooth, apical marginal zones virtually absent; tergum V a bit less coarsely imbricate; tergum VI finely imbricate and largely impunctate; sterna finely imbricate.

Fine pubescence generally consisting of sparse, minute, appressed or decumbent white to fulvous setae, such minute setae often simple but sometimes plumose, intermixed in places with black setae; minute fulvous setae sparse on lower face, more numerous on frons except upper frons such setae blending to more erect largely simple, fulvous setae and black bristles; gena with scattered fulvous setae similar to that of face; postgena with erect, light fulvous setae. Pronotal lobe with dense, white to fulvous, plumose setae; mesoscutum and mesoscutellum with scattered, minute, simple, subappressed to decumbent, fulvous setae; metanotum with abundant, white, plumose setae; mesepisternum with similar setae to that of mesoscutum, such setae blending ventrally to longer, more white or light fulvous setae ventrally; metepisternum with dense, white, plumose setae; propodeum lateral surface with similar setae to that of metepisternum. Legs with largely fulvous setae. Metasomal terga with minute, appressed fulvous setae sparse, such setae more abundant and noticeable on terga IV–VI, and longer on terga V and VI, except anterior-facing surface of tergum I glabrous; terga II–V with apical fimbriae of minute, fine, simple, fulvous setae; sterna with elongate, erect, simple, light fulvous scopal setae, such setae with wavy apices. Bristles in distinct areas of body: Labrum with some erect, simple bristles; upper frons



Figures 30–32. Workers of *Scaptotrigona* Moure. **23.** Lateral habitus of *Scaptotrigona* (*Gymnotrigona*) *psile*, new species. **31.** Facial view of *S.* (*G.*) *psile*. **32.** Facial view of *S.* (*G.*) *guimaraesensis* Laroca & Almeida.

and vertex with black bristles, those of vertex longest, particularly medially posterior to ocelli; fulvous to black bristles along anterior margin of pronotal lobe; mesoscutum anterior and lateral margins with abundant black bristles; tegula with suberect black bristles anteriorly, sometimes with a few fulvous bristles intermingled; mesoscutellum with fulvous to black bristles, particularly long and abundant along posterior margin; fulvous bristles scattered over mesepisternum and a distinct line of fulvous and black bristles along rounded margin with preëpisternum; legs with numerous black bristles, those of distitarsomeres typically fulvous; metatibial and metabasitarsal bristles black and frequently with fulvous tips. Metasoma terga I–V without bristles on discs; terga I–III without bristles laterally, except sometimes with one or two short, subdecumbent, fulvous bristles at apicolateral margin on tergum III; terga IV and V with short, subdecumbent, fulvous bristles laterally; tergum VI with such bristles sparse on disc, and long, erect, fulvous bristles laterally and along margin.

♀: *Latet*.

♂: *Latet*.

HOLOTYPE: ♀, Venezuela: Monagas, La Pica (5 km E), 9°50′N, 63°3′W, 6 November 1980, G.W. Otis (SEMC).

PARATYPES: 8♀♀, Venezuela: Monagas, La Pica (5 km E), 9°50′N, 63°3′W, 6 November 1980, G.W. Otis (SEMC).

ADDITIONAL MATERIAL: 1♀, Venezuela: Fed. Dist., Caracas Bot. Garden, Santa Rosalia Park, 19 Jan. 1980, N. Ramirez, ex flowers *Luehea* [Malvaceae: Grewioideae: *Luehea* Willd.] (SEMC).

ETYMOLOGY: The specific epithet is taken from the Ancient Greek adjective ψῑλός (*psīlós*, feminine ψῑλή / *psīlḗ*), meaning, "bare".

Scaptotrigona* (*Gymnotrigona*) *nuda Engel, new species

ZooBank: urn:lsid:zoobank.org:act:587185D9-98D2-464F-BC1B-6E0A71A4023E

(Figs. 33, 34)

DIAGNOSIS: This species belongs to a small group of species in *Gymnotrigona* lacking minute fimbriae on the metasomal terga. Among these, *S. nuda* could be most easily confused for *S. jujuyensis* (Schrottky), which occurs further to the South and Southeast in northern Argentina. It can be most readily distinguished from this species by the longer bristles on the mesoscutum (*vide* Key, *supra*), and from *S. guiamaraesensis* Laroca & Almeida by the darker facial coloration (*cf*. Figs. 32, 34).

DESCRIPTION: As described for *S. totobi* (*vide supra*) except as follows: ♀: Total body length approximately 5.9 mm, forewing length (to base of humeral sclerite) 5.7 mm. Head wider than long, width 2.45 mm, length 1.97 mm; compound eye length 1.45 mm; upper interorbital distance 1.61 mm, lower interorbital distance 1.48 mm. Scape length 0.94 mm, slightly longer than torulocellar distance, torulocellar distance 0.88 mm. Clypeus approximately 1.6× as wide as long, length 0.64 mm, width 1.03 mm. Malar area 1.6× flagellar diameter. Preoccipital carina strong, lamellate dorsally and bordered by deep medial and lateral indentations, carina interrupted laterally by deep concavity, preoccipital lamella extending slightly into concavity, lower margin of concavity projected upward as acute, lamellate tooth.

Integument generally black to dark brown; clypeus dark chestnut brown with apical margin black; supraclypeal area dark chestnut brown; face below tangent of antennal toruli dark chestnut brown along inner orbit, blending to faint yellow spot by clypeus and lower antennal torulus margin (resembling in this respect the facial markings of S. bipunctata); malar space dark chestnut brown to dark brown; scape dark brown above, narrowly yellow brown to orange ventrally; flagellum dark brown except light brown to orange below; hypostomal borders yellow brown; wing membranes hyaline clear; veins orange.

Sculpturing as described for *S. psile* (*vide supra*).

Fine pubescence generally consisting of sparse, minute, appressed or decumbent white to fulvous setae, such minute setae often simple but sometimes plumose, intermixed in places with fuscous to black setae; minute white setae sparse on lower face, more numerous on frons except becoming more fulvous, blending to more erect fulvous to black setae on upper frons and vertex; gena with scattered white setae similar to that of face; postgena with longer, erect, fulvous setae. Pronotal lobe with dense, white, plumose setae; mesoscutum and mesoscutellum with scattered, minute,

Figures 33–36. Workers of *Scaptotrigona* Moure. **33.** Lateral habitus of *Scaptotrigona* (*Gymnotrigona*) *nuda*, new species. **34.** Facial view of *S.* (*G.*) *nuda*. **35.** Facial view of *S.* (*G.*) *stipula*, new species. **36.** Lateral habitus of *S.* (*G.*) *stipula*.

simple, subappressed to decumbent, fulvous setae; metanotum with abundant, white, plumose setae; mesepisternum with similar setae to that of mesoscutum, such setae blending ventrally to longer, white setae ventrally; metepisternum and lateral surface of propodeum with dense, white, plumose setae. Legs with largely black setae, except coxae, trochanters, and proximally on femora long, white to fuscous setae. Metasomal terga with sparse, minute, appressed, simple, fulvous setae, although such setae slightly longer and more numerous, albeit still sparse, on terga IV–VI; sterna with

elongate, erect, off-white to lightly fuscous simple scopal setae, such setae with wavy apices. Bristles in distinct areas of body: upper frons and vertex with black bristles, those of vertex longest, particularly medially posterior to ocelli; black bristles along anterior margin of pronotal lobe; mesoscutum anterior and lateral margins with abundant black bristles; tegula with suberect black bristles anteriorly; mesoscutellum with black bristles abundant, longest along margin; black bristles scattered over mesepisternum and a distinct line of such bristles along rounded margin with preëpisternum; legs with numerous black bristles, those of distitarsomeres typically fulvous; metatibial and metabasitarsal bristles black, some with fulvous tips. Metasoma terga I–III without bristles; tergum IV typically without bristles but sometimes with one or two minute, subdecumbent, fulvous to black bristles laterally; tergum V with a few, minute, subdecumbent, fulvous to black bristles laterally; tergum VI with minute bristles sparse to absent on disc, and long, erect, fulvous or fuscous to black bristles laterally and along margin.

♀: *Latet*.

♂: *Latet*.

HOLOTYPE: ♀, Bolivia: El Beni, Beni Stn., Palm Camp, Savannah, NE of San Borja, 28 July 1988, R.W. Brooks (SEMC).

ETYMOLOGY: The specific epithet is taken from the Latin adjective *nūdus*, meaning, "unclothed".

Scaptotrigona* (*Gymnotrigona*) *stipula Engel, new species

ZooBank: urn:lsid:zoobank.org:act:EA923AC6-8A8D-444B-B194-806EEF7F29F2

(Figs. 35, 36)

DIAGNOSIS: This species is exceptionally similar to *S. depilis* (Moure), and could represent a subspecific color variant. For now I have retained it as a full species, which can be distinguished from *S. depilis* most easily by the lighter mesoscutellum, which is brownish orange with yellow brown apically; and by the sparse, minute, decumbent bristles of terga III and IV black and tergum VI with minute, black bristles (absent in *S. depilis*).

DESCRIPTION: As described for *S. totobi* (*vide supra*) except as follows: ♀: Total body length approximately 6.0 mm, forewing length (to base of humeral sclerite) 5.8 mm. Head wider than long, width 2.58 mm, length 2.06 mm; compound eye length 1.48 mm; upper interorbital distance 1.67 mm, lower interorbital distance 1.52 mm. Scape length 0.97 mm, slightly longer than torulocellar distance, torulocellar distance 0.88 mm. Clypeus approximately 1.6× as wide as long, length 0.67 mm, width 1.09 mm. Malar area 1.6× flagellar diameter. Preoccipital carina strong, lamellate dorsally and bordered by deep medial and lateral indentations, carina interrupted laterally by deep concavity, preoccipital lamella extending slightly into concavity, lower margin of concavity projected upward as acute, lamellate tooth.

Integument generally dark reddish brown except as noted; labiomaxillary complex yellow brown; clypeus medially and apically yellow to yellow brown, laterally brown, mediobasally orange brown; supraclypeal area orange brown; face below tangent of antennal toruli orange brown, blending to reddish brown above, with circular spot of yellow bordering clypeus and lower outer margin of antennal torulus; malar space orange brown to yellow brown; scape dark brown above, narrowly yellow brown to orange ventrally; flagellum dark brown except light brown to orange below;

face above antennal toruli reddish brown, lighter below and darker above; vertex, posterior of head, and majority of gena reddish brown, darker above than below; gena bordering malar space brownish yellow; hypostomal borders yellow. Pronotum reddish or orange brown; mesoscutum black; mesoscutellum reddish brown to brown with yellow brown medioapically; mesepisternum dark reddish brown except posteriorly becoming lighter; metepisternum and propodeum reddish brown. Legs largely dark reddish brown except yellow brown on coxae, trochanters, tibiae at apices, tarsi, and retrolateral surface of metatibia and metabasitarsus. Wing membranes hyaline clear to faintly parchment colored; veins orange. Metasoma largely reddish brown except lighter apically on tergum II and somewhat on tergum III; sterna yellow brown.

Sculpturing as described for *S. psile* (*vide supra*).

Fine pubescence generally consisting of sparse, minute, appressed to decumbent pale yellow to fulvous setae, such minute setae often simple but sometimes plumose; minute yellow setae sparse on lower face, more numerous on frons except upper frons such setae blending to more erect largely simple, fulvous setae and black bristles; gena with scattered yellow setae similar to that of face; postgena with erect, dark fulvous to fuscous setae. Pronotal lobe with dense, yellow, plumose setae; mesoscutum and mesoscutellum with scattered, minute, simple, subappressed to decumbent, fulvous setae; metanotum with abundant, yellow, plumose setae; mesepisternum with similar setae to that of mesoscutum, such setae blending ventrally to longer, more pale yellow or fulvous setae ventrally; metepisternum with dense, pale yellow, plumose setae; propodeum lateral surface with similar setae to that of metepisternum. Legs with largely pale yellow setae. Metasomal terga with minute, appressed fulvous setae sparse, such setae more abundant and noticeable on terga IV–VI, and longer on terga V and VI, except anterior-facing surface of tergum I glabrous; terga II–V with apical fimbriae of minute, fine, simple, yellow to golden setae; terga III–V with small, diffuse patches of appressed, plumose, pale yellow tomentum far laterally; sterna with elongate, erect, simple, pale yellow scopal setae, such setae with wavy apices. Bristles in distinct areas of body: Labrum with some erect, simple bristles; upper frons and vertex with dark fulvous to black bristles; fulvous to black bristles along anterior margin of pronotal lobe; mesoscutum anterior and lateral margins with abundant black bristles; tegula with suberect black bristles anteriorly; mesoscutellum with fulvous to black bristles, longest on posterior margin; black bristles scattered over mesepisternum, becoming fulvous ventrally, and a distinct line of black bristles along rounded margin with preëpisternum; legs with numerous black bristles, those of distitarsomeres typically fulvous; metatibial and metabasitarsal bristles black, sometimes with fulvous tips. Metasoma terga I and II without bristles on discs; tergum I without bristles laterally; tergum II with minute, subdecumbent, dark fuscous to black bristles laterally; terga III–V with sparsely scattered minute, subdecumbent dark fuscous to black bristles on discs and particularly laterally, those on terga IV and V progressively more fulvous; tergum VI with minute, subdecumbent to suberect, black bristles sparsely scattered on disc, and long, erect, pale yellow bristles laterally and along margin.

♀: *Latet*.

♂: *Latet*.

Holotype: ♀, Brazil: S.P. [São Paulo], Barretos, II-15-66 [15 February 1966], Camargo & Weaver (SEMC).

Etymology: The specific epithet is the Latin noun *stipula*, meaning, "stubble".

Subgenus *Scaptotrigona* Moure, *s.str*.

Trigona (*Scaptotrigona*) Moure, 1942: 315. Type species: *Trigona postica* Latreille, 1807, by original designation.

This is the most widespread and diverse group of species in *Scaptotrigona* (Appendix), and corresponds to the *postica* species group *sensu* Engel (2022a, 2022b). A key to the first part of this subgenus was provided by Engel (2022b).

Baryorygma Engel, new subgenus

ZooBank: urn:lsid:zoobank.org:act:EEF2D9F6-C4E4-4F6C-8DB7-C66F0A9808B1

TYPE SPECIES: *Scaptotrigona fimbriata* Engel, new species.

DIAGNOSIS: This subgenus superficially resembles *Eoscaptotrigona* but can be easily distinguished by the presence of vitreous yellow to yellow markings on the lower face (Figs. 37, 38, 40) (chestnut brown to black in *Eoscaptotrigona*), and the more widely spaced punctures of the upper frons, with the punctures separated by 1–2× a puncture width (separated by much less than a puncture width or even contiguous in *Eoscaptotrigona*). In addition the subgenus has a largely dark brown to black integument (aside from the aforementioned facial markings); the bristles of the vertex, mesoscutum, and mesoscutellum distinctly longer than the median ocellar diameter; the scape lacks minute, erect to suberect bristles along its length; terga without a dense covering of elongate, erect, simple, yellow setae (present only in *Dasytrigona*); terga III–V are not covered in yellow tomentum, but may have whitish tomentum to varying degrees laterally on terga IV–V or on the disc of tergum VI; and the discs of metasomal terga III–V have abundant, erect to subdecumbent bristles. The facial markings are similar to those observed in some species of *Gymnotrigona* and *Scaptotrigona s.str*., likely reflecting a relationship closer to these subgenera than the otherwise putatively plesiomorphic *Eoscaptotrigona*.

ETYMOLOGY: The new subgeneric name is a combination of the Ancient Greek adjective *βᾰ́ρῠ́ς* (*barús*, meaning, "heavy"), and the noun *ὄρῠγμᾰ́* (*órugma*, meaning, "trench"), as an allusion to these including some of the larger and more robust species of *Scaptotrigona* and the excavated trench of the mesoscutellum (from which the genus takes its name: *σκᾰ́πτω* / *skáptō*, meaning, "to dig out"). The gender of the name is neuter.

Key to Species of *Baryorygma*

1. Metasomal sternal setae light fuscous to white 2
—. Metasomal sternal setae dark fuscous to black [Guyana] ... *S. emersoni* (Schwarz)
2(1). Apical margins of metasomal terga II–V without fimbriae 3
—. Apical margins of metasomal terga II–V with fimbriae composed of fine, plumose, white to slightly yellowish setae (Fig. 41) [Bolivia] ..... *S. fimbriata*, n. sp.
3(2). Metasomal tergum I with bristles laterally; larger species, head widths 2.81–2.94 mm [South American] 4
—. Metasomal tergum I without bristles laterally; smaller species, head widths 2.62–2.75 mm [Costa Rica, Panama] ..... *S. subobscuripennis* (Schwarz)
4(3). Clypeus and supraclypeal area chestnut brown to dark brown, and lower paraocular area with circular area of vitreous yellow to yellow brown bor-

Figures 37–38. Facial views of workers of *Scaptotrigona* Moure. **37.** *Scaptotrigona* (*Baryorygma*) *bipunctata* (Lepeletier). **38.** *S.* (*B.*) *tricolorata* Camargo.

dering clypeus and lower outer margin of antennal torulus but widely separated from inner orbit (Fig. 37); metasomal terga I and II with short bristles laterally [Bolivia, Brazil, Peru] ..... *S. bipunctata* (Lepeletier)

—. Clypeus and supraclypeal area yellow to yellow brown, sometimes with longitudinal streaks of brown, and lower paraocular area yellow from inner orbit to clypeus, although brown below near clypeal apex and above at upper tangent of antennal toruli (Fig. 38); metasomal terga I and II with long bristles laterally [Bolivia, Brazil, Peru] ..... *S. tricolorata* Camargo

Scaptotrigona* (*Baryorygma*) *fimbriata Engel, new species
ZooBank: urn:lsid:zoobank.org:act:AA2382FA-FA18-4A6F-8D2B-A85EBA7E13CE
(Figs. 39–41)

Diagnosis: This species is similar to the larger South American species of the subgenus and particularly to *S. bipunctata* (Lepeletier) in regards to facial patterning. However, the new species differs from all others in the group by the presence of distinct apical fimbriae on metasomal terga II–V.

Description: As described for *S. totobi* (*vide supra*) except as follows: ♀: Total body length approximately 7.1–7.9 mm, forewing length (to base of humeral sclerite) 6.5–6.8 mm. Head wider than long, width 2.82–2.94 mm, length 2.33–2.42 mm; compound eye length 1.64–1.70 mm; upper interorbital distance 1.85–1.91 mm, lower interorbital distance 1.76–1.82 mm. Scape length 1.03–1.09 mm, slightly longer than torulocellar distance, torulocellar distance 0.97–1.03 mm. Clypeus approximately 1.6–1.7× as wide as long, length 0.70–0.82 mm, width 1.21–1.30 mm. Malar area approximately 1.7–1.8× flagellar diameter. Preoccipital lamella not extending into concavity, lower margin of concavity acutely rounded, projecting upward as short lamellate tooth.

Integument generally black to dark brown; clypeus and supraclypeal area chestnut brown; face below tangent of antennal toruli chestnut brown along inner orbit, blend-

Figures 39–41. Worker of *Scaptotrigona* (*Baryorygma*) *fimbriata*, new species. **39.** Lateral habitus. **40.** Facial view. **41.** Dorsal view of metasoma.

ing to yellow or yellow brown by clypeus and antennal torulus; scape dark brown above, light brown to yellow brown ventrally; hypostomal borders yellow brown. Legs dark brown except coxae and trochanters brown.

Integument smooth and shining amid punctures; clypeus with small shallow punctures separated by a puncture width or frequently much more; supraclypeal area with similar punctures; lower face with small shallow punctures as on clypeus along inner orbit blending to nearly impunctate toward epistomal sulcus and antennal torulus; punctures becoming minute and separated by a puncture width or slightly more on frons and ocellocular area. Metasomal terga with minute contiguous punctures giving granulose appearance, except anterior-facing surface of tergum I smooth, pre-

gradular areas and apical marginal zones finely imbricate and impunctate; tergum VI imbricate and largely impunctate; sterna finely imbricate.

Metasomal terga II–V with apical fimbriae composed of plumose setae tinged yellow or white; tergum I without black bristles laterally, or rarely with only a few minute bristles.

♀: *Latet*.

♂: *Latet*.

Holotype: ♀, Bolivia: El Beni, Beni Stn., Palm Camp, NE of San Borja, 25 July 1988, R.W. Brooks (SEMC).

Paratypes: 9♀♀, Bolivia: El Beni, Beni Stn., Palm Camp, NE of San Borja, 25 July 1988, R.W. Brooks (SEMC); 5♀♀, Bolivia: El Beni, Beni Stn., Palm Camp, Savannah, NE of San Borja, 28 July 1988, R.W. Brooks (SEMC).

Additional material: 1♀, Bolivia: Santa Cruz Dept., 3.7 km SSE Buena Vista Hotel Flora y Fauna, 17°29.95'S, 63°33.15'W, 400–440 m, 4–9-XI-2002, primary forest FIT, R. Leschen (SEMC); 1♀, Paraguay: Contesa, III-1954, F.H. Walz (SEMC); 2♀♀, Peru: Madre de Dios, Pakitza Bio. Stn., Reserved Zone, Manu National Park, 317 m, 11°56'41''S, 71°17'0''W, 22 Oct 2000, R. Brooks (SEMC).

Etymology: The specific epithet is the Latin noun *fimbria*, meaning, "a fringe at the edge", and the suffix *–ātus*, which forms adjectives from nouns and indicates possession of a quality or thing.

Astegotrigona Engel, new subgenus

ZooBank: urn:lsid:zoobank.org:act:AB0EDA82-B4E5-4376-B8D8-BBC1B3BF53CE

Type species: *Trigona mexicana* Guérin-Méneville, 1844.

Diagnosis: This subgenus is most similar to *Gymnotrigona* owing to the absence of prominent suberect bristles on the discs of metasomal terga III–V, although sometimes with a few, minute (less than 0.5× ocellar diameter), subdecumbent bristles, typically laterally. Unlike *Gymnotrigona*, however, the mesoscutellum is broadly rounded apically (more blunt medially in *Gymnotrigona*) and comparatively short such that the apex extends only to the basal margin of propodeum (Fig. 11) (rather than distinctly overhanging the basal third or more of the propodeum in *Gymnotrigona*). In addition, metasomal terga III–V are finely imbricate and somewhat shining between scattered minute punctures, rather than coarsely imbricate to densely punctate in *Gymnotrigona*. The integument is entirely black in *Astegotrigona*, and the scape lacks the minute, erect bristles otherwise present in *Dasytrigona*. Similarly, the terga are not densely setose as is distinctive for *Dasytrigona*, and there is no covering of tomentum on terga III–V. The subgenus is currently known only from Mesoamerica.

Etymology: The new subgeneric name is a combination of the Ancient Greek adjective ἄστεγος (*ástegos*, meaninig, "without roof": *ἀ– / a–*, alpha privativum for negation, and *στέγος / stégos*, meaning, "roof") and *Trigona*. The gender of the name is feminine.

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APPENDIX
Checklist of species of *Scaptotrigona*

The following provides a list of those species currently recognized in *Scaptotrigona*, arranged as to subgenus. Synonyms are excluded. Type species for the subgenera are indicated by an asterisk (*). I had earlier (Engel, 2022a) overlooked the description of *S. marialiceae* Laroca & Almeida from Paraná (Laroca & Almeida, 2015). It may be that this species is a senior synonym of *S. silviae* Engel. There is also what appears to be another distinct *tubiba*-like species from Rio Grande do Norte, Brazil, but this awaits further study. The subgenus *Scaptotrigona s.str.* is equivalent to the *postica* group *sensu* Engel (2022a). Annotations are made to indicate which of the more narrowly circumscribed species groups therein apply to the sections indicated by Engel (2022b).

Subgenus *Astegotrigona* Engel, n. subgen.
- *S. mexicana* (Guérin-Méneville)*
- *S. wheeleri* (Cockerell)
- + approx. 1 undescribed species

Subgenus *Baryorygma* Engel, n. subgen.
- *S. bipunctata* (Lepeletier)
- *S. emersoni* (Schwarz)
- *S. fimbriata* Engel, n. sp.*
- *S. subobscuripennis* (Schwarz)
- *S. tricolorata* Camargo

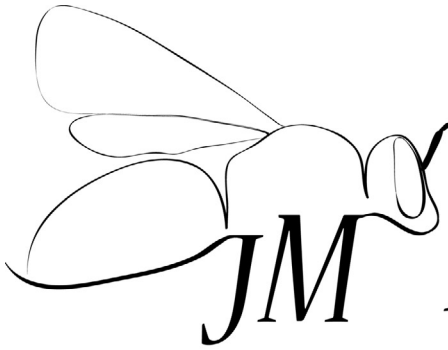
Subgenus *Dasytrigona* Engel, n. subgen.
- *S. fulvicutis* (Moure)*

Subgenus *Eoscaptotrigona* Engel, n. subgen.
- *S. luteipennis* (Friese)
- *S. polysticta* Moure*
- *S. totobi* Engel, n. sp.

Subgenus *Gymnotrigona* Engel, n. subgen.
- *S. aurantipes* Engel, n. sp.
- *S. depilis* (Moure)*
- *S. guimaraesensis* Laroca & Almeida
- *S. hellwegeri* (Friese)
- *S. jujuyensis* (Schrottky)
- *S. nuda* Engel, n. sp.
- *S. psile* Engel, n. sp.
- *S. stipula* Engel, n. sp.

Subgenus *Sakagamilla* Moure
- *affabra* species group
  - *S. affabra* (Moure)*
- *tubiba* species group
  - *S. marialiceae* Laroca & Almeida
  - *S. pasiphaea* Engel
  - *S. silviae* Engel
  - *S. tubiba* (Smith)
  - + perhaps 1 undescribed species

Subgenus *Scaptotrigona* Moure, *s.str.*
- *incertae sedis* [section A, *partim*]
  - *S. baldwini* Engel
  - *S. barrocoloradensis* (Schwarz)
  - *S. pectoralis* (Dalla Torre)
  - *S. santiago* Engel
- *ederi* species group [section A, *partim*]
  - *S. caduceus* Engel
  - *S. ederi* Engel
  - *S. extranea* Engel
  - *S. faviziae* Engel
  - *S. gonzalezi* Engel
  - *S. illescasi* Engel
  - *S. kuperi* Engel
  - *S. rosellae* Engel
- *magdalenae* species group [section A, *partim*]
  - *S. magdalenae* Engel
  - *S. tatacoensis* Engel
- *ochrotricha* species group [section A, *partim*]
  - *S. macarenensis* Engel
  - *S. nigrohirta* Nogueira & Santos-Silva
  - *S. ochrotricha* (Buysson)
  - *S. xanthotricha* Moure
  - *S. yungasensis* Engel
- *postica* species group, *s.str.* [= section B]
  - *S. limae* (Brèthes), *species inquirenda*
  - *S. postica* (Latreille)*
  - *S. turusiri* (Janvier), *species inquirenda*
  - + approx. 11 undescribed species



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