

A new genus of halictine bees from Central America (Hymenoptera: Halictidae)

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ABSTRACT

A new genus and species of halictine bees (Halictinae: Halictini: Mexalictina) is described and figured from a mid-elevation forest in northwestern Costa Rica. *Meliamelitta vulcanus* gen. and sp. n. is allied to *Mexalictus* Eickwort but differs in the structure of the labral basal elevation, the obtuse epistomal sulcus, the elongate mandibles, the pectinate inner metatibial spur, the unique pterostigma, and the sculpturing of the basal area of the propodeum, among other features. A key is appended to the genera and subgenera of Mesoamerican, Central American, and Caribbean Halictinae to facilitate the recognition of the genus.

Keywords: Anthophila, Halictinae, Halictini, *Mexalictus*, taxonomy, Neotropical

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INTRODUCTION

For the last ten years I have had an isolated female of a unique kind of halictine from Costa Rica (Fig. 1) and have long hoped to locate a male, or at least further specimens. To date, no such fortune has arisen, and so I am finally providing an account of this interesting species in the hope of inspiring others also to seek out these bees. The discovery of the male may reveal that this species is nested as an exceptionally unusual member of *Mexalictus* Eickwort but as current evidence of such a placement is utterly lacking, I have proceeded with a generic account. As noted, it is similar to *Mexalictus* in most features, a genus that ranges in mountainous areas from southern Arizona to western Panama (Eickwort 1978; Michener 2007; Dumesht 2013), but differs in a number of key traits summarized in the generic account below. Like *Mexalictus*, the new species was found in a forested mountain area, although at mid-elevation (1200–1300m) rather than the higher elevation cloud forests frequented by the former (1600–3500m). Like species of *Mexalictus*, the floral associations of the new species are unknown. Included is a key to the genera and subgenera of Mesoamerican, Central American, and Caribbean Halictinae, which should aid the identification of the genus.

MATERIAL AND METHODS

The holotype of the new species described herein is from the slopes of Volcán Tenorio of northwestern Costa Rica and was deposited in the Instituto Nacional de Biodiversidad (INBio), Costa Rica, which a few years after my visit was handed over to the Costa Rican government, leading to some challenges and uncertainties.

Since March 2015 the collections have been in flux, at one time said to be destined for the Museo Nacional de Costa Rica in San José, while at others for the Universidad Nacional de Costa Rica in Heredia, neither of which has had the space to accommodate INBio. In the interim most material has remained in the INBio facility in Santo Domingo despite the lack of adequate collection support.

The new term *plaga* (plural *plagae*) is adopted from Latin, meaning, 'region' or 'zone', and is here used to refer to that specialized region of augmented black integument along the inner orbit of the compound eyes in Caenohalictini, and referred to as facial foveae by Gonçalves & Melo (2009). This patch of integument



Fig. 1. — *Meliameletta vulcanus* gen. and sp. n., ♀, holotype, from Volcán Tenorio, Costa Rica, lateral habitus.

is fundamentally different from facial foveae, as universally used, and the homology between what are here called plagae and the traditional foveae is not at all evident. Accordingly, in order to maintain some distinction between these two different kinds of structures I here refine the terminology. Aside from this one addition, the morphological terminology adopted generally follows that of Eickwort (1969), Engel (2001), and Michener (2007). Measurements were taken with an ocular micrometer on an Olympus SZX12 stereomicroscope.

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SYSTEMATICS

Tribe Halictini Thomson

Subtribe Mexalictina Engel

***Meliamelitta* gen. n.**

Type species: *Meliamelitta vulcanus* sp. n. (*vide infra*).

Diagnosis: The new genus is most similar to *Mexalictus*, but differs in the obtuse epistomal sulcus (acute to nearly orthogonal in *Mexalictus*); orbicular basal elevation of the labrum (flattened basal elevation); the elongate, almost bladelike female mandible (female mandible shorter and never bladelike in *Mexalictus* or *Habralictus* Moure); compound eye with weak indentation abutting mandibular articulation (not present in *Mexalictus*); pectinate inner metatibial spur (serrate to ciliate or even crenulate in *Mexalictus*); posterior margin of pterostigma in marginal cell parallel with anterior wing margin and forming orthogonal angle with apical margin within cell (converging and forming obtuse angle in *Mexalictus*); broad marginal cell with broadly rounded apex (not pointed on anterior wing margin in *Mexalictus*); and oblique and transverse striae of the basal area of the propodeum (without striae or with weak longitudinal striae extending from base but not reaching apical margin in *Mexalictus*; minutely roughened in *Habralictus*).

Description

Integument dark brown, dull metallic on head and mesosoma (Fig. 1). Head about as long as wide. Mandible elongate (almost as long as compound eye), apical tooth long, with small, weakly developed preapical tooth; mandibles overlapping apically and somewhat blade like (Figs 3, 6). Maxillary palpus long, hexamerous (six palpomeres); galea with fringe of setae along ventral-apical margin and patch of similar setae at apex. Hypostomal ridge carinate, anteriorly forming rounded angle. Basal area of labrum subrectangular, with medial orbicular elevation (flattened basal elevation in *Mexalictus*), distal process broadly triangular, without keel (distal process narrowly triangular in *Mexalictus*). Epistomal sulcus forming slightly obtuse angle (acute to nearly orthogonal in *Mexalictus*). Malar space linear, lower border of compound eye abutting mandibular articulations. Lower tangent of compound eye bordering epistomal sulcus, lower border of compound eye weakly anteroventrally concave at anterior mandibular articulation (Figs 2, 3, 6) (not concave in *Mexalictus*); compound eye emarginate in upper third (Fig. 2), without ocular setae. Facial plagae absent (Figs 2–4) (present in *Caenohalictini*). Ocelli normal, not enlarged, lateral ocelli situated at upper tangent of compound eyes. Preoccipital ridge rounded (Fig. 9).

Pronotal lateral angle obtuse (Fig. 9); dorsal ridge rounded (more prominently angled in *Mexalictus*); lateral ridge rounded (Fig. 8); transverse ridge angled and complete (*i.e.*, mesoscutal lip not completely overlapping raised surface of pronotal collar). Mesoscutum broadly rounded anteriorly (Fig. 9), with anterior margin low and gently rounded (Figs 8, 9) (*i.e.*, mesoscutal lip ill-defined), not forming a distinct anterior-facing surface above pronotal collar. Tegula oval.

Mesoscutellum gently convex and rounded (not bigibbous). Basal area of propodeum long, as long as mesoscutellum, with oblique and transverse striae (Fig. 7) (without striae or with weak longitudinal striae extending from base but not reaching apical margin in *Mexalictus*); posterior surface with dorsal and lateral ridges rounded (Fig. 7), propodeal pit narrow and comparatively shallow; lateral surface with elongate setae forming an ill-defined canistra (*sensu* Engel 2001). Forewing with basal vein distad 1cu-a by $5\times$ vein width (separated 1–4 $\times$ vein width in *Mexalictus*); pterostigma large, broadly rounded within marginal cell (Figs 11, 12), posterior margin in marginal cell almost parallel with anterior wing margin (converging to wing margin in *Mexalictus*), apical margin in marginal cell orthogonal with anterior wing margin, thus, angle of



Figs 2–5. — *Meliameletta vulcanus* gen. and sp. n., ♀, holotype: 2, Facial view; 3, Facial view, apical oblique; 4, Facial view, slightly dorsal oblique; 5, Head, lateral view.

apical margin and posterior margin beyond r-rs about orthogonal (obtuse in *Mexalictus*); marginal cell of forewing broadly rounded on anterior wing margin (acute in *Mexalictus*); three submarginal cells (Figs 11, 12); 1rs-m, 2rs-m, and 1m-cu not weakened (Figs 11, 12) (weakened in *Gastrohalictina*). Hind wing with five distal hamuli arranged 2-1-2. Probasitarsal brush well defined, tawny; metafemoral scopa (fiscina) composed of elongate, wavy, branched setae; metabasitibial plate well developed, all margins carinate, apex broadly rounded (Fig. 10) (acute



Figs 6–7. — *Meliamelitta vulcanus* gen. and sp. n., ♀, holotype: 6, Mandibles; 7, Basal area of propodeum.

in *Mexalictus*); inner metatibial spur coarsely pectinate, with three thick, apically rounded branches (Fig. 15) (serrate to ciliate or even crenulate in *Mexalictus*), outer spur minutely ciliate.

Metasomal terga without apical or basal bands of pubescence (Figs 13, 14) (as in *Mexalictus* except *Mexalictus albofasciatus* Dumesh from Honduras); pseudopygidial area of tergum V broadly rounded apically, long, encompassing much of mediolongitudinal length of exposed dorsal surface, without median slit (Figs 16, 17) (slit present in Augochlorini); metasomal scopa present (Fig. 14) (somewhat similar to *Habralictus* Moure), composed of setae similar to metafemoral scopa on sterna I, II, and proximal half of III, apical half sternum III and apical thirds of remaining sterna with elongate, erect, simple, dark fuscous setae, sometimes apically arched or hooked, similar scopal setae on border portions of ventral-facing lateral margins of terga.

Etymology: The generic name is a combination of the name of the Ancient Greek tree nymphs, *Meliae* (Μελίαι), and μέλιττα (mélitta, meaning, ‘bee’). The gender of the name is feminine. It is common to use *Halictus* Latreille as the derivation for many halictine bees (e.g., *Mexalictus*, *Dialictus* Robertson, *Zonalictus* Michener, *Electrolictus* Engel), but given that the derivation of the name refers to the social gathering of species of *Halictus* [Ancient Greek verb ἁλίζω / hālízō, meaning, ‘to gather’ and suffix -τος / -tos, which makes verbal adjectives – ‘gathered’; interestingly, another meaning for ἁλίζω is, ‘to make salty’, and brings to mind an allusion of the common name, ‘sweat bees’] and that this species could just as likely be solitary rather than social, I felt it best to avoid such a connotation in the formation of the name.

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***Meliamelitta vulcanus* sp. n.**

(Figs 1–17)

Diagnosis: As for the genus (*vide supra*).

Description

♀: Total body length 7.67mm, forewing length 7.08mm. Head about as long as wide, length 1.89mm (as measured from peak of vertex to apical margin of clypeus in frontal view), width 1.87mm; upper interorbital distance 1.07mm, lower interorbital distance 0.97mm; lengths of maxillary palpomeres (I–VI) 0.17mm, 0.19mm, 0.27mm, 0.24mm, 0.20mm, 0.24mm; apical half of clypeus extending below lower tangent of compound eyes; compound eye broader than gena in profile; ocelli below level of vertex in facial view, separated from preoccipital area by slightly less than 2× median ocellar diameter. Intertegular distance 1.28mm. Forewing venation as in Figs 11 & 12.

Clypeus largely smooth with scattered coarse punctures, such punctures smaller and denser laterally along epistomal sulcus, integument also faintly imbricate in some areas; supraclypeal area as on clypeus except punctures smaller and denser above than below; face below antennal tangent with coarse shallow punctures separated by 1–2× a puncture width, integument finely imbricate mesally blending to smoother toward ocular border; face above antennal tangent with small dense, nearly contiguous punctures (punctures separated by much less than a puncture width to nearly a puncture width), such punctures become shallower and more spaced along ocular borders and more separated near antennal toruli; frontal line represented by distinct impunctate strip from median ocellus narrowing ventrally to a point slightly more than antennal torulus diameter above upper antennal tangent; punctures of upper face similar to those of ocellular area and vertex; gena with punctures as on upper face except sparser posteriorly, separated posteriorly by 1–2× a puncture width; postgena imbricate with exceedingly sparse shallow punctures. Mesoscutum with minute, dense punctures, punctures separated by much less than a puncture width (nearly contiguous in most places) except laterally punctures become contiguous, where evident integument finely imbricate, median line deeply impressed at anterior

margin for slightly more than median ocellar diameter, then shallowly impressed for distance of about a median ocellar diameter; tegula faintly imbricate; mesoscutellum sculptured as on mesoscutum except punctures more spaced centrally; metanotum with minute punctures smaller than on mesoscutellum separated by about a puncture diameter; mesepisternum coarsely imbricate, almost costulate, with shallow punctures separated by a puncture width or less except punctures denser anteriorly and sparser posteriorly; hypopimeral area as on mesepisternum



Figs 8–10. — *Meliameletta vulcanus* gen. and sp. n., ♀, holotype: 8, Mesosoma, lateral view; 9, Posterior of head and mesosoma, dorsal view; 10, Metabasitibial plate.

except punctures fainter and sparser; metepisternum transverse costulate above blending to coarsely imbricate below; propodeum with oblique striae basally and laterally and transverse striae medially on basal area, lateral surface coarsely imbricate with scattered, shallow, setigerous punctures, posterior surface as on lateral surface except punctures denser. Metasomal terga finely and faintly imbricate, particularly on tergum I where integument nearly appearing smooth; tergum I with sparse, minute punctures at broadly curved arch to dorsal-facing surface; remaining terga with minute punctures dense, separated by less than a puncture width, sparser in zones posterior to graduli and impunctate in exceedingly narrow apical margins; tergum V with large, broad pseudopygidial area encompassing large mediolongitudinal portion of exposed tergum, surface of pseudopygidial area microareolate; sterna finely and faintly imbricate, impunctate over much of surface except shallow, setigerous punctures apically, and sternum V also with smaller shallow punctures laterally.

Head and mesosoma dark brown with dull metallic greenish-bluish hue; mandible dark brown, nearly black in proximal half; labiomaxillary complex dark brown; clypeus and supraclypeal area dark brown, without metallic hue except along margins; antenna dark brown; tegula semi-translucent brown; postgena dark brown; legs dark brown, nearly black; wing membranes lightly browned, veins reddish brown; metasoma dark brown except tergum I orangish in proximal half, reddish brown in posterior half, exceedingly narrow apical margins of terga reddish brown; sterna dark brown except blending to lighter proximally on each sternum.

Pubescence typically golden except outer surfaces of meso- and metatibiae and basitarsi black or dark fuscous; pronotal dorsolateral ridge, mesoscutum, mesoscutellum, and metanotum with scattered, suberect to erect, simple, dark fuscous setae; metafemoral scopa (more like a fiscina) composed of elongate, pale setae with long, wavy branches; metasoma with shorter, branched setae golden to brassy golden, intermingled with suberect to erect, simple, dark fuscous setae, such setae more prominent laterally and apically, progressively longer and more numerous on more apical terga; pseudopygidial area flanked by dark fuscous setae, some with hyaline apices; apical halves to thirds of sterna with elongate, thick, dark fuscous to nearly black, simple setae sometimes arched or hooked apically, similarly setae on ventral-facing surfaces of terga, sterna I, II, and basal half of sternum III with elongate, pale setae with long wavy branches (like those of metafemoral scopa), collectively sternal setae forming metasomal scopa.

♂: *Latet*.

Material examined

Holotype, ♀, COSTA RICA: Prov. Alajuela, P.N. Volcán Tenorio, Falda Norte V. Tenorio 1 Los Quemados, 1200–1300m, 3 Feb–18 Abr 2010, J.A. Azofeifa, Tp. Malaise (INBIO).

Etymology: The specific epithet is the Latin noun *vulcānus* in apposition, referring to the location of the type locality on the slopes of a volcano.

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Key to genera and subgenera of Mesoamerican, Central American, and Caribbean Halictinae

Note that for the tribe Augochlorini and the halictine subtribe Sphecodina the keys stop at the suprageneric grouping and direct users to existing keys that already cover these groups in greater detail.

- 1 Metasomal tergum V of female with medioapical margin of pseudopygidial area undivided; metasomal tergum VII of male with pygidial plate and without transverse premarginal ridge or carina forming a false apex 2
- Medioapical margin of pseudopygidial area of metasomal tergum V of female cleft (in nonparasitic forms); metasomal tergum VII of male without pygidial plate and without transverse premarginal ridge or carina forming a false apex [tribe not treated further: *vide* Engel 2000; Michener 2007] Augochlorini Beebe



Figs 11–12. — *Meliameletta vulcanus* gen. and sp. n., ♀, holotype: 11, Forewing; 12, Detail of submarginal and marginal cells.

- 2(1) Facial plagae present [tribe Caenohalictini Michener] 3
 – Facial plagae absent [tribe Halictini Thomson] 11
- 3(2) Posterior surface of propodeum enclosed by strong carina 4
 – Posterior surface of propodeum not or only partially surrounded by strong carina ... 6
- 4(3) Compound eye bare or nearly so; epistomal sulcus, near anterior tentorial pit, forming paraocular lobe protruding down into clypeus, basal margins of this lobe at right or acute angle to each other [genus *Agapostemon* Guérin-Méneville s.l.] 5
 – Compound eye with setae about as long as ocellar radius; epistomal sulcus quite obtusely angulate laterally *Agapostemonoides* Roberts & Brooks
- 5(4) Female with one or more of following characters: mesoscutum with upturned flange anteriorly, pronotal lobe with yellow maculation, labral process acutely pointed, both supraclypeal area rugose and anterior third of mesoscutum punctate; male with one or more of following: mesoscutum with upturned flange anteriorly, flagellomeres elongate and flattened apically, pronotal lateral ridge (*sensu* Eickwort 1969) distinctly carinate, clypeus abruptly truncate and volsella with a long protrusion on mesal anterior corner . . .
 *A. (Notagapostemon)* Janjic & Packer
 – Without above combinations of characters . . *A. (Agapostemon)* Guérin-Méneville s. str.
- 6(3) Metasomal terga II–IV without basal bands or patches of white setae except for series of pale setae often arising from gradulus 7
 – Metasomal terga II–IV with basal bands or patches of white setae, bands or patches sometimes small and largely hidden under preceding terga *Dinagapostemon* Moure & Hurd, *partim*

- 7(6) Propodeal profile with subhorizontal or sloping upper portion about as long as or longer than metanotum; metasomal terga II–IV without lateral gradular carina *or* metasoma metallic blue or green or both 8
- Propodeal profile almost entirely declivitous, with only narrow sloping portion above, next to metanotum; metasomal terga II–IV with lateral gradular carinae *and* metasoma nonmetallic *Rhinetula* Friese
- 8(7) Compound eye hirsute, setae long, about as long as diameter of median ocellus or longer; metasoma metallic, without yellow markings 9
- Compound eye bare or with scattered minute setae; metasoma nonmetallic black or brown, rarely honey-coloured, commonly with yellow markings .. *Habralictus* Moure
- 9(8) Inner metatibial spur with 5–11 branches; subhorizontal basal zone of propodeum about as long as metanotum 10
- Inner metatibial spur typically with three branches; subhorizontal basal zone of propodeum over 1.5× as long as metanotum *Caenohalictus* Cameron
- 10(9) Body uniformly bright metallic green or blue; metasomal terga II–IV with lateral gradular carinae; epistomal sulcus laterally forming prominent paraocular lobe protruding into clypeus *Paragapostemon* Vachal
- Body not uniformly bright metallic; metasomal terga II–III and often tergum IV without lateral gradular carinae; epistomal sulcus obtusely angulate laterally . *Dinagapostemon* Moure & Hurd, *partim*
- 11(2) 1rs-m and/or 2rs-m weaker than 2Rs [subtribe Gastrohalictina Schrottky: genus *Lasioglossum* Curtis s. l.] 12
- 1rs-m and 2rs-m as strong as 2Rs 16
- 12(11) 1rs-m weaker than 2Rs, albeit not always as weak as 2rs-m or 2m-cu 13
- 1rs-m as strong as 2Rs *L. (Lasioglossum)* Curtis s.str.
- 13(12) Posterior surface of propodeum in nonmetallic species usually with lateral vertical carina extending only partway to summit or, if attaining summit, then usually not extending mesad across upper margin, so that usually no carina present between dorsal and posterior surfaces, but in metallic species, with or without propodeal carinae, sometimes even more strongly carinate than *Evylaeus* Robertson; body black or metallic greenish or bluish, rarely bright metallic green 14
- Posterior surface of propodeum margined laterally by vertical carina that extends upward to summit and then mesad at least partly across upper margin, so that there is a sometimes interrupted carina between dorsal and posterior surfaces; body almost always nonmetallic *L. (Evylaeus)* Robertson
- 14(13) Mandible of female with small, dorsal preapical tooth; mid-dorsal length of male gonobase usually over one-third as long as gonocoxa 15
- Mandible of female strongly bidentate apically; mid-dorsal length of male gonobase less than one-fourth as long as gonocoxa *L. (Eickwortia)* McGinley
- 15(14) Head and mesosoma brilliant green and granulose or smooth, usually nearly or completely impunctate [Caribbean] *L. (Habralictellus)* Moure & Hurd
- Head and mesosoma dull greenish or bluish, sometimes brassy, if brilliant green, then strongly punctate and not granulose *L. (Dialictus)* Robertson
- 16(11) Metasomal terga I–IV with apical bands of posteriorly directed, plumose, tomental, pale setae, sometimes also with basal bands, those of male sometimes limited to extreme sides of terga; epistomal sulcus of female obtusely angulate [subtribe Halictina Thomson: genus *Halictus* Latreille s. l.] 17
- Metasomal terga I–IV without bands or *if* bands present, then epistomal sulcus acute (*Mexalictus albofasciatus* Dumesh); epistomal sulcus of female variable (slightly obtuse to acute) 18
- 17(16) Integument not metallic, usually black; metasomal sternum IV of male often broadly emarginate; dorsal gonostylar process of male not cleft .. *H. (Odontalictus)* Robertson

- Integument of head and mesosoma at least partially dull metallic greenish or bluish, rarely black; metasomal sternum IV of male with posterior margin straight; dorsal gonostylar process of male divided by deep cleft forming a slender (mesal) lobe that may be elongate or rarely lost (so that cleft is not evident) *H. (Pachyceble)* Moure
- 18(16) Metafemoral scopa of female present; body more finely sculptured, surface often dull; lateral surface of propodeum punctate or imbricate, not coarsely reticulate; body coloration often weakly metallic, sometimes brightly metallic or not metallic [subtribe Mexalictina Engel] 19



Figs 13–17. — *Meliameletta vulcanus* gen. and sp. n., ♀, holotype: 13, Metasoma, dorsal view; 14, Metasoma, lateral view; 15, Inner metatibial spur; 16, Pseudopygidial area; 17, Surface sculpturing of pseudopygidial area.

- Metafemoral scopa of female weak to absent; body generally coarsely sculptured or sometimes with extensive shining impunctate areas, but *if* more finely sculptured, then free part of marginal cell about or more than 3× as long as part subtended by submarginal cells; lateral surface of propodeum coarsely reticulate-areolate; body coloration not metallic, metasoma often largely red to reddish orange [subtribe not treated further: *vide* Engel 2024) Sphecodina Schenck
- 19(18) Epistomal sulcus acute to nearly orthogonal; inner metatibial spur serrate to ciliate, sometimes crenulate; basal area of propodeum without striae or with weak longitudinal striae not reaching apical margin; marginal cell acutely rounded on anterior wing margin; basal elevation of labrum flattened *Mexalictus* Eickwort
- Epistomal sulcus obtuse; inner metatibial spur pectinate; basal area of propodeum with oblique and transverse striae; marginal cell broadly rounded on anterior wing margin; basal elevation of labrum orbicular *Meliamelitta* gen. n.

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