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New records of Halictini (Hymenoptera, Halictidae, Halictinae) from Manipur, India

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ABSTRACT: Distributional records of the Halictinae bees of the genus *Halictus* (the subgenus *Seladonia), viz., H. lucidipennis* Smith, *H. propinquus* Vachal, genus *Lasioglossum* (the subgenus *Ctenomia*) *albescens* (Smith, 1853), *L. cavernifrons* Bluthgen, 1926, *L. sikkimense* (Blüthgen, 1926), *L. splendidulum* (Vachal, 1895), *L. vagans* (Smith, 1857) and genus *Patellapis* (*Pachyhalictus*) *liodoma* (Vachal, 1895)*, P. reticulosa* (Dalla Torre, 1896) from North-East India, Manipur are listed. Re-described the female specimen, along with the collection site. © 2022 Association for Advancement of Entomology

KEY WORDS: Taxonomy, redescription, female specimen, distributional records

INTRODUCTION

As it is known that bees play an important role in the pollination of angiosperms, and the members of Halictidae also have great influence in this service. Halictidae is the second largest group of bees, with approximately 4,510 recognized species worldwide (Ascher and Pickering, 2022). Four subfamilies are recognized under Halictidae (Michener, 2007); Rophitinae Schenck, 1866; Nomiinae Robertson, 1904; Nomioidinae Börner, 1919; and Halictinae Thomson, 1869. Halictid bees make their nest in the soil or rarely in rotting wood; and have a very diverse social structure like eusocial, semi social, solitary and communal (Michener, 1978; Schwarz *et al.,* 2007). Some of genera and species in Halictidae are kleptoparasites. In the Asia region, Halictidae family is common, often dominating other bee families in number of species and individuals. The Halictini is the largest tribe of Halictidae having more than 1600 species, within the subfamily of sweat bees (Halictinae), under 23 genera *sensu* Michener (2007).

The bee Subgenus *Seladonia* Robertson of subfamily Halictinae has 75 recognized species (Ascher and Pickering, 2022). According to both molecular and morphological phylogenetic analyses (Pesenko and Davydova, 2004; Danforth *et al.,* 1999; Gibbs *et al.,* 2012), this genus is the sister group to the genus *Halictus* Latreille. Subgenus *Seladonia* differs from *Halictus* by the body having a metallic green or blue-green luster, posterior margin of fourth metasomal sternum straight and male genitalia with medial lobe on upper gonostylus. We treat *Seladonia* at the Sub generic level in this study, in accordance with (Michener, 2007). The Genus *Lasioglossum*

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Curtis is highly diverse group of bees with approximately 1881 species worldwide (Ascher and Pickering, 2022). The main character of this genus is the fore wing with weakened 2r-m and 2m-cu veins in female. *Lasioglossum* is classified into two groups (Michener, 2007): (1) the *Hemihalictus* Cockerell series (weak-veined *Lasioglossum*), which includes all subgenera with weak second sub marginal vein (1rs-m) of the female fore wing; and (2) the *Lasioglossum* series (strong-veined *Lasioglossum*) which includes all subgenera with strong second sub marginal vein (1rs-m) of the female fore wing. The subgenus *Patellapis* (*Chaetalictus*) comprises 46 species and has recently been revised (Timmermann and Kuhlmann, 2008 a, b). The name *Patellapis* was first used by Friese (1909) proposing a subgenus *Patellapis* for a group of black *Halictus* found in South Africa, characteristic for having a large rounded apical plate on the abdomen of the male.

Unfortunately, North East India has little available data of Halictid bees. Only a few common species have been documented by Smith (1853), Vachal (1895), Bingham (1897) and Bluthgen (1925). A few new species from other North East Indian states have been published like *Halictus lucidipennis* Smith, 1853 and *Halictus propinquus* Smith, 1853 from Assam, *Halictus subauratoides* Blüthgen, 1925 from Meghalaya and some species of genus *Lasioglossum* by other international authors. However, till date no reports on halictid bees from Manipur exist. Therefore, it was crucial to investigate the Halictid bee fauna of Manipur. The present study aims to revise the Halictidae species of North East India.

MATERIALS AND METHODS

The specimens studied here belong to the Tribe Halictini of subfamily Halictinae which were deposited in the National Pusa Collection (NPC), ICAR – IARI, New Delhi, India. The specimens were brought to the laboratory, suitably processed according to established procedures for further studies. Identification was done by the literature (Sakagami, 1989; Bluthgen, 1925; Sakagami *et al.,* 1996; Michener, 2007). Photography was with Leica Stereo Zoom Microscope M205 FA fitted with digital camera Leica DFC425 C. Terminology mainly follows Michener (1978, 2007), Bluthgen (1925) and Sakagami *et al.* (1989).

Description of the collection site**:** Manipur is a state in northeastern India and bounded by the Indian states of Nagaland to the North, Mizoram to the south and Assam to the west. The state lies at a latitude of 23°83'N – 25°68'N and a longitude of 93°03'E – 94°78'E. The state covers an area of 22,327 square kilometers (8,621 sq miles). Collection sites are Krishi Vigyan Kendra (KVK) farm Ukhrul, ICAR Research Complex for NEH Region, Kamong, Sangaithel area, and Langol ICAR farm Manipur, India.

Abbreviation used: Body Length (BL) (from Clypeus margin to metasomal tip), Head length (HL), Head Width (HW), Eye Length (EL), Wing Length (WL), Inter Ocellar Distance (IOD),

Gena Length (GL), Gena Width (GW), Clypeus Length (CL), Clypeus Width (CW), Abdomen Length (AL), Abdomen Width (AW).

RESULTS AND DISCUSSION

Subfamily Halictinae

Genus I- *Halictus*

***Halictus* (*Seladonia*) *lucidipennis* Smith, 1853 (Figs. 1-6)**

Halictus (*Seladonia*) *lucidipennis* Smith, 1853: 362; Ember, 1980: 483.

Halictus varipes Morawitz, 1876: 223-224; Sakagami and Ember, 1987: 326, pauly 1999: 146

Halictus vernalis Smith, 1879: 30

Halictus niloticus Smith, 1879: 32

Halictus magrettii Vachal, 1892: 137.

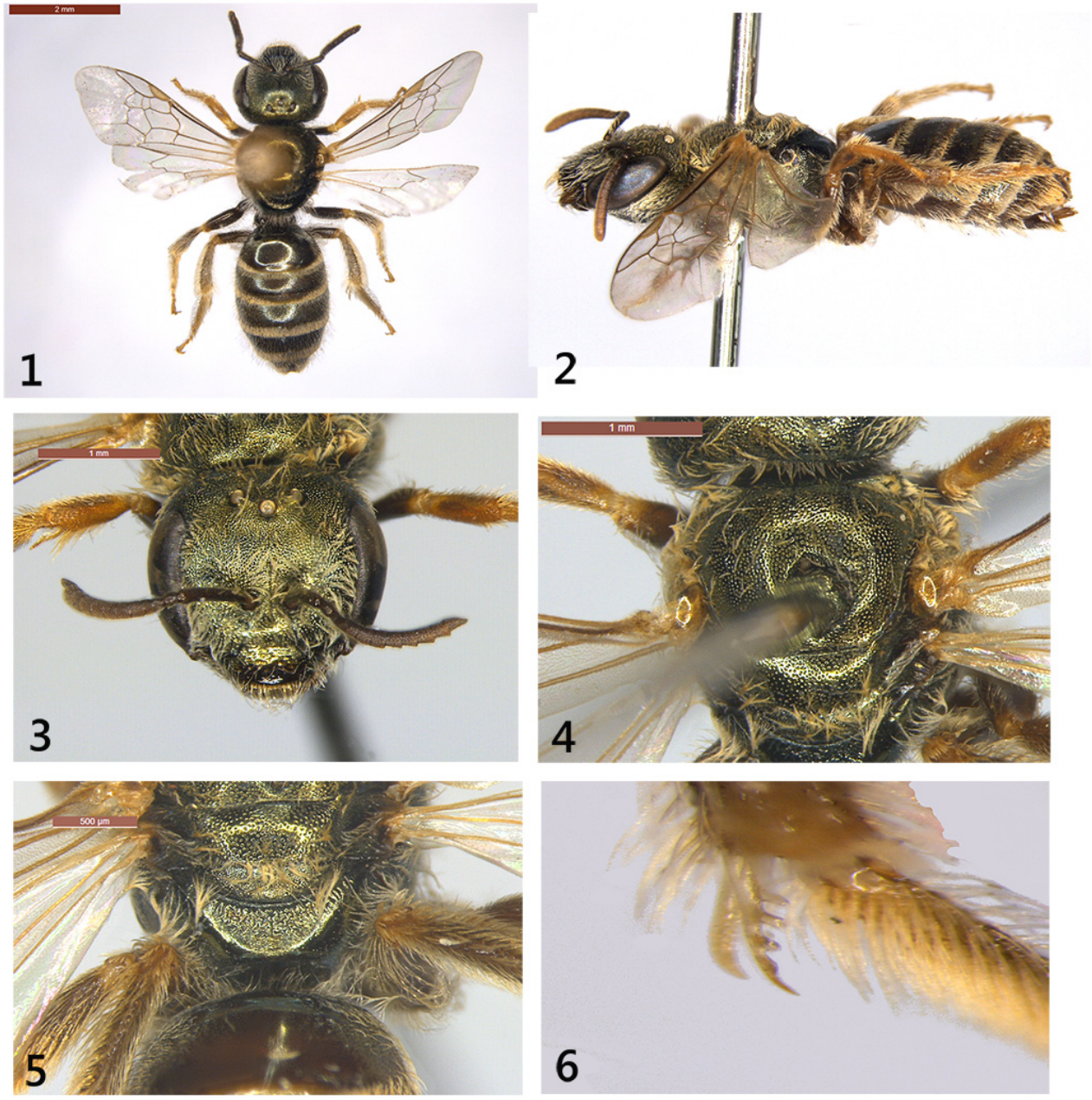
Halictus dives Perez, 1895: 52.

Halictus omanicus Perez, 1907: 489.

*Halictus variipes*var.*koptica* Blüthgen, 1933: 16.

Halictus (*Seladonia*) *sudanicus* Cockerell, 1945: 352.

Halictus (*Seladonia*) *tokarensis* Cockerell, 1945: 352.



Figs. 1-6 Female. *Halictus* (*Seladonia*) *lucidipennis*, 1-Dorsal habitus; 2- Lateral habitus; 3- Head; 4- Thorax; 5- Propodeum; 6-Hind tibial spur teeth

Figs. 7-10 Male. *Halictus* (*Seladonia*) *lucidipennis*, 7 –Dorsal habitus; 8- lateral habitus; 9- Sternum; 10-Head

Halictus (*Seladonia*) *dissensis* Cockerell, 1945: 353

Halictus (*Seladonia*) *medanicus* Cockerell, 1945: 354.

Halictus (*Seladonia*) *mogrensis* Cockerell, 1945: 355.

Halictus (*Seladonia*) *tokariellus* Cockerell, 1945: 355.

Halictus (*Seladonia*) *medaniellus* Cockerell, 1945: 356.

Halictus (*Seladonia*) *morinellushyemalus* Warncke, 1982: 134.

Halictus (*Seladonia*) *lucidipennis* (Smith, 1853: 362); Sakagami and Ember, 1987: 321; Pesenko, 2004: 101.

Diagnosis: *Halictus* (*Seladonia*) *lucidipennis* can be distinguished from other *Seladonia* species by the following: small size, fine punctures dorsally; tegula sparsely punctured anteriorly, basal propodeal with longitudinal ridges reaching up to mid-length only.

Coloration: Generally pale, non-metallic parts rather brownish; flagella ventrally dark brown; tegula semi-transparent, pale brown; legs chestnut brown. Base of fore and mid tibiae yellow or sometimes pale brown; fore tibia and tarsi, apices of mid tibia and hind femur, and base and apex of hind tibia pale brown; mid and hind tibiae pale chestnut brown.

Structure: BL- 6.19mm

Head (Fig. 3): distinctly wider than mesosoma and metasoma; HW- 1.72mm HL- 1.43mm;CL- 0.31mm, CW- 0.56mm, IOD- 0.58mm; vertex flat and sometimes faintly concave medially; frons mildly but distinctly convex, frontal carina relatively long;clypeus sub apically slightly depressed gently rosebelow; marginal area strongly depressed; hypostoma very sparsely and finely punctured.

Mesosoma (Fig. 4): pronotum with lateral ridge acute but not extending below; lateral surface coriaceous and shagreen, below striated with dull vertically or obliquely paralleled ridges, much weaker than in *H. propinquus;* puncture on mesoscutum and scutellum homogeneous; propodeal dorsum with enclosure mildly depressed (Fig. 5); ridges occupying only anterior 1/2 to 2/3; medially ridges parallel but often slightly irregular; lateral field rather broadly impunctate and finely coriaceous and shining; tegula with anterior hairs short, punctures fine and sparse; post outer area broadly smooth.

Metasoma (Fig. 1): shiny; elongate and oval; apical hair band present T1- T5; T1 smooth with very fine and sparse punctures, T2 sparsely punctuate, T3 and T4 moderately punctuate; pygidial plate U-shaped; T2 to T5rough compared to T1;well developed scopa; basitibial plate oval, pointed apically; Inner hind tibial spur with3-4 relatively long and round-tipped teeth.

Male – BL- 8.19 mm (Figs. 7- 10)

More slender than female, same coloration and punctuation; head is longer than female; flagella ombre yellow, pale.

Flower record: Marigold

***Halictus* (*Seladonia*) *propinquus* Smith (Figs. 11-16)**

Halictus propinquus Smith, 1853, 1: 60-61.

Halictus grandiceps Cameron, 1896, 41(4): 98-99.

Halictus alexis Cameron, 1896, 41(4): 99-100.

Halictus pinguis Vachal, 1902, 2: 230.

Halictus propinquss Smith: Michener, 1978, 51(16): 528.

Halictus propinquus Smith: Ebmer, 1980, 12(2): 481.

Halictus (*Seladonia*) *propinquus* Smith: Sakagami and Ebmer, 1987, 19(2): 321.

Halictus (*Seladonia*) *propinquus* Smith: Ebmer, 1988, 68(4/6): 345.

Halictus (*Seladonia*) *propinquus* Smith: Fan, 1991, 34(4): 479- 480.

Halictus (*Seladonia*) *propinquus* Smith: Dawut and Tadauchi 2001, 41: 167-169.

Diagnosis: *Halictus* (*Seladonia*) *propinquus* can be distinguished from other *Seladonia* species by the following: sizelarger than *H. lucidipennis*, moderate punctures dorsally; tegula punctured anterior to mid-length, basal propodeal with reticulation reaching up to mid-length or up to Propodeal ridge.

Coloration: Generally darker, non-metallic parts are dark brown; flagella ventrally dark brown; pronotum lobe apically dark brown to blackish; tegula black brown anteriorly; legs dark brown to blackish. Base of fore and mid tibiae are brown, rarely yellowish.

Structure: BL- 7.55mm

Head (Figs. 13): as wide as mesosoma and metasoma. HW- 1.71mm HL- 1.51mm;CL- 0.42mm, CW- 0.68mm, IOD- 0.38mm vertex flatter not concave medially; frons mildly convex only; frontal carina variable long but shorter than in *H. lucidipennis.* paraocular area with dull epistomal angle; supraclypeus same as in *H. lucidipennis* but sparsely punctured; hypostoma finely punctured.

Mesosoma (Fig. 14): pronotum with dull lateral ridge; lateral surface coriaceous and shagreen,

below striated with strong vertically or obliquely paralleled ridges*;* irregular puncture on mesoscutum and scutellum; mesoscutellum medially not depressed longitudinally; propodeal dorsum ridges reaching up to edge (Fig. 15); lateral propodeal field smooth and shining with rather sparse punctures; tegula with long anterior hairs, punctuation denser than *H. lucidipennis.*

Metasoma (Fig. 11): less shiny; elongate and oval; denser punctuation; apical hair bands present T1-T5; T1 dull with sparse punctures, T2 sparsely punctuate, T3 & T4 moderately punctuate; pygidial plate U-shaped; well developed scopa; basitibial plate oval, pointed apically; Inner hind tibial spur with 4 – 6 small teeth. (Fig. 16).

Male – Unknown

Flower record: Rose, dahlia, cauliflower

Genus II – *Lasioglossum*

***Lasioglossum* (*Ctenomia*) *albescens* (Smith, 1853) (Figs. 17-22)**

Halictus albescens Smith, 1853:61.

Halictus albozonatus homonym Smith, 1879:32.

Halictus senescens (Smith, 1879:30); Vachal, 1895: 430.

Halictus albicinctus Dalla Torre, 1896:52.

Halictus picipes homonym Cameron, 1897:102.

Halictus minikoiensis Cameron, 1902a:58.

Halictus bengalensis Cameron, 1903:131.

Halictus manila Ashmead, 1904b:281.

Halictus luzonicus Strand, 1910:208.

Halictus javanensis Strand, 1910:198

Halictus amblypygus Strand, 1913

Halictus javanicus Friese, 1914:23. Bluthgen, 1926:492.

Lasioglossum (L) albescens (Smith); Michener, 1965: 173

Diagnosis: *Lasioglossum* (*Ctenomia*) *albescens* can be distinguished from other *Ctenomia* species by the following: size medium to large; body color grey-black; wing slightly cloudy grey; fine, wavy small ridges on the base of propodeum.

Coloration: body color grey-black because of the more pronounced shagreen; hair bands on tergites 2-5 rusty yellow; wing slightly cloudy grey to almost water-white, veins and spots brownish-yellow; flagella at ventral side sometimes red-brown to yellow-brown.

Structure: BL- 9.53mm

Head (Fig. 19): longer than wide. HW- 2.26mm HL- 2.06mm; EL- 1.58mm; CL- 0.5mm, CW- 0.6mm, IOD- 0.38mm clypeus complete black, shiny; paraoccular area sparsely covered by hairs.

Mesosoma (Fig. 20): smooth, silky matt with sparse; irregular arranged puncture on mesoscutum and scutellum; fine small longitudinal ridges or sometimes wavy long wrinkles on propodeal dorsum not reaching up to mid(Fig. 21); lateral Propodeal field smooth and shining with rather sparse punctures; Propodeal triangle usually smooth edged on the sides and top; tegula finely punctured; WL- 5.78mm.

Metasoma (Fig. 17): less shiny; elongate and oval; apical hair bands present T2- T5; silky, irregular spots on both sides at the base of the horizontal part of tergite 1, T1 dull with sparse punctures, T2 - T4 moderately punctuate; pygidial plate U-shaped; well developed scopa; basitibial plate oval, pointed apically; Inner hind tibial spur with 3 – 4 small teeth. (Fig. 22)

Flower record: Calendula, rose, cauliflower.

***Lasioglossum* (*Ctenomia*) *cavernifrons* Bluthgen, 1926 (Figs. 23-28)**

Halictus cavernifrons Bluthgen, 1926: 658

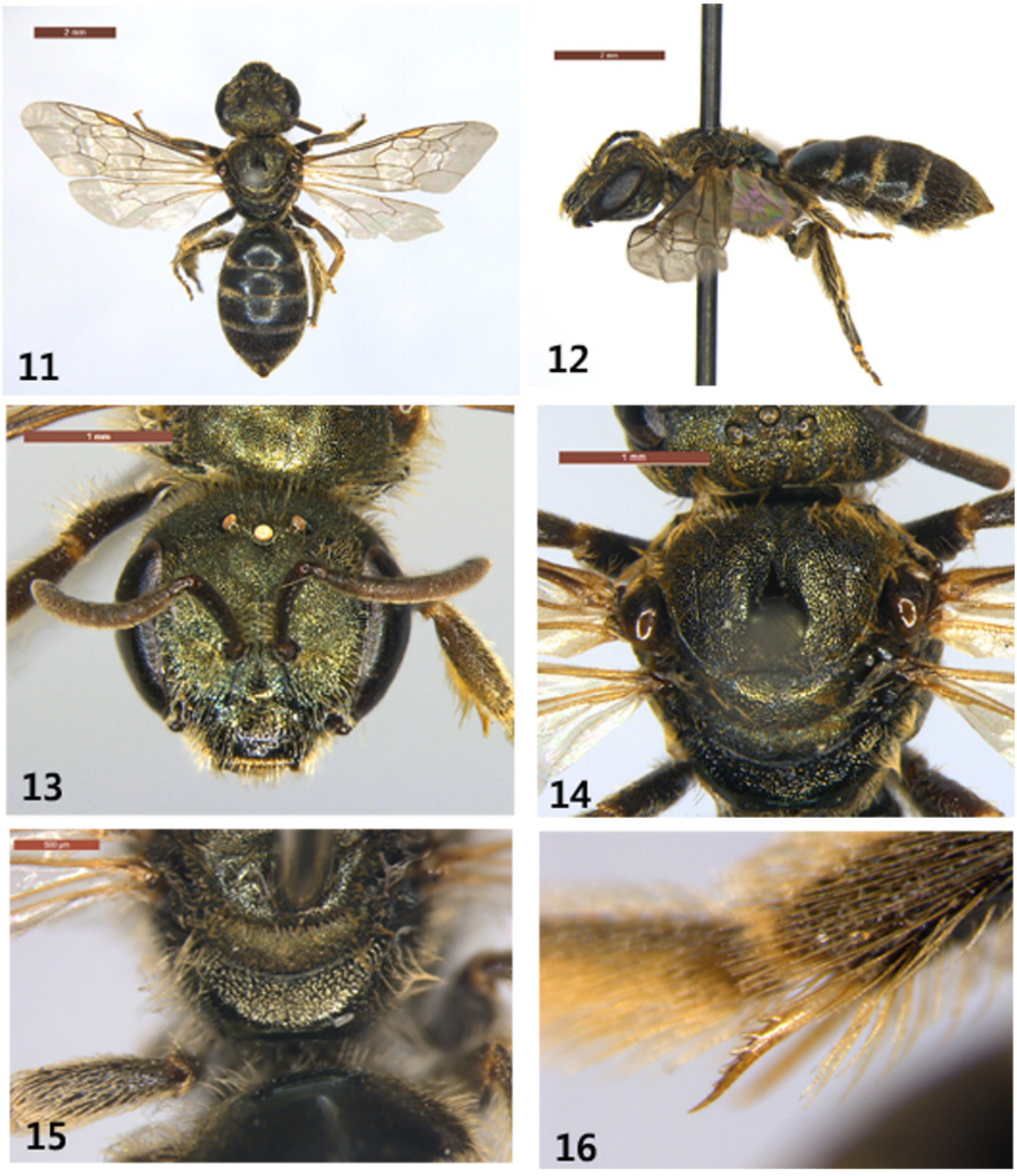
Diagnosis: *Lasioglossum* (*Ctenomia*) *cavernifrons* can be distinguished from other *Ctenomia* species by the following: size medium tolarge; body colour black; wing transparent; oblique ridges on the sides and less irregular, wrinkled stripes in middle on the base of propodeum.

Coloration: body colour shiny black; basal propodeum not carinate; hair bands on tergites T2-T4 white hair band; wing transparent; veins and spots brown; flagella ventrally reddish brown; tegula brown colored; hairs on the legs pale white.

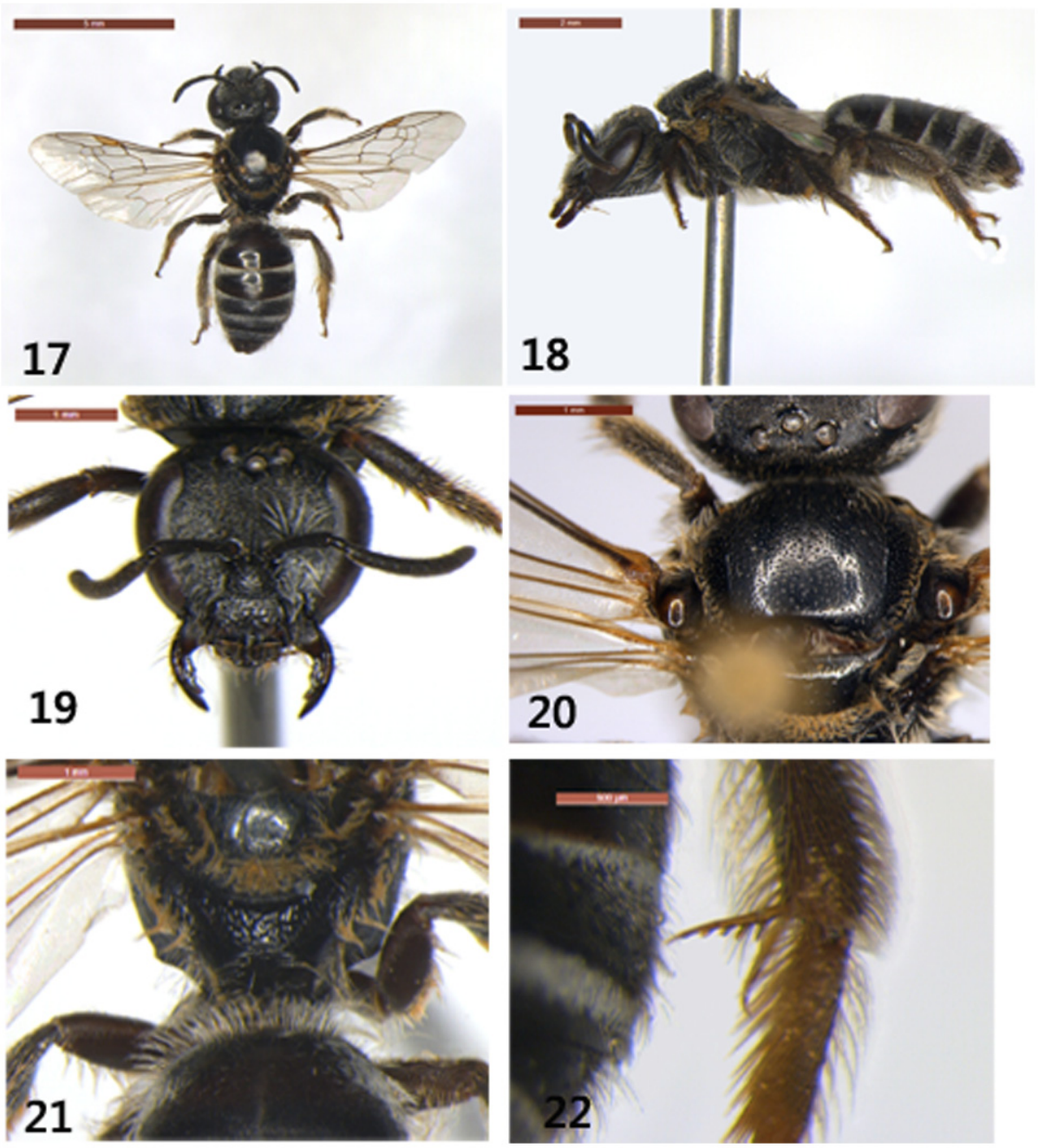
Structure: BL- 8.41mm

Head (Fig. 25): Head almost as broad as thorax, as long as wide; HW- 2.21mm; HL- 2.10mm; EL- 1.58mm; CL- 0.61mm, CW- 0.59mm, IOD- 0.35mm clypeus complete black, shiny; area near clypeus with dense white hair; mandible upper jaw tip red; flagella ventrally reddish brown.

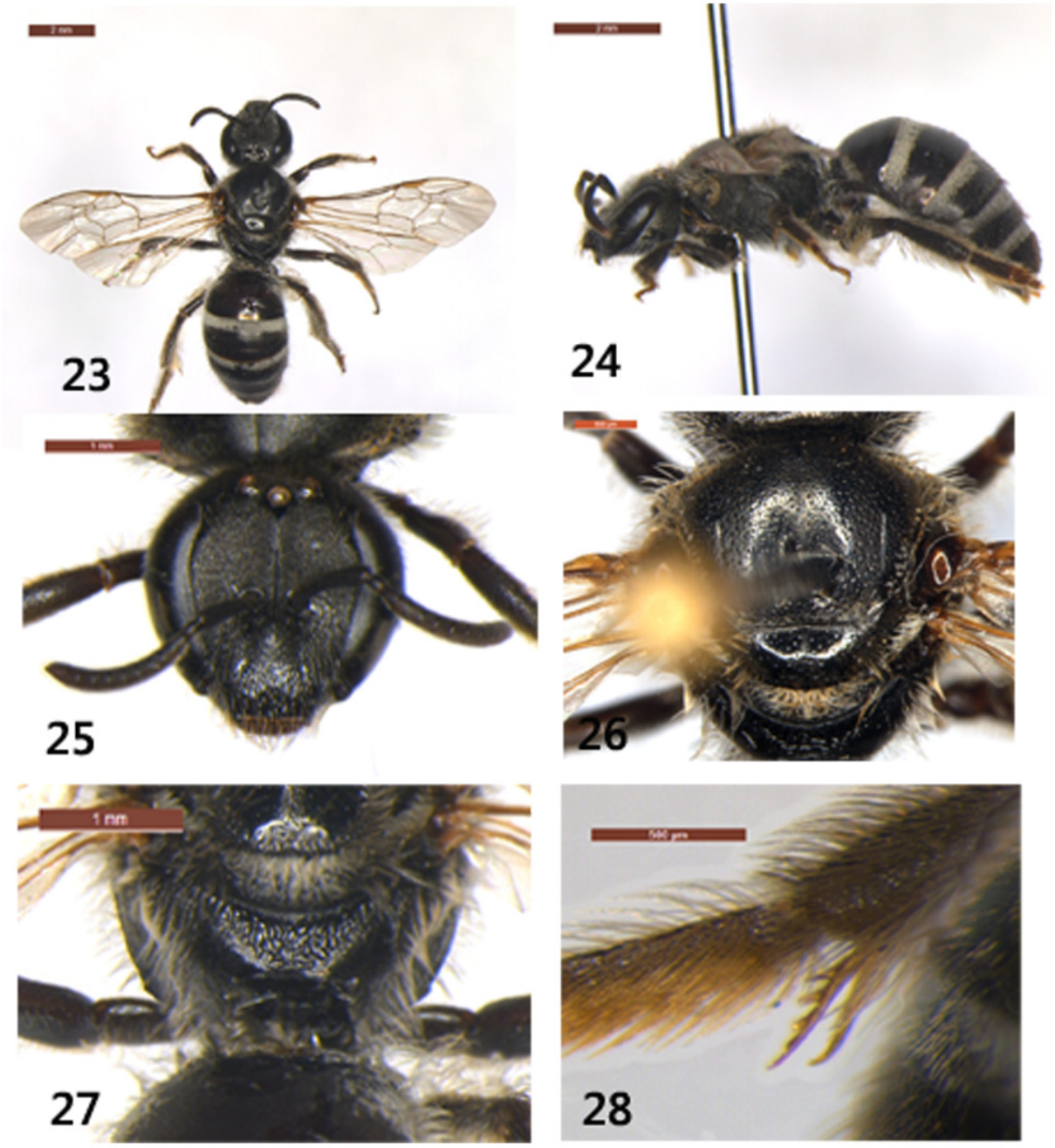
Mesosoma (Fig. 26): scutum and scutellum shiny, with extremely fine, flat dots, in the middle, distributed irregularly and more or less scattered; basal propodeum not carinate,less irregular oblique



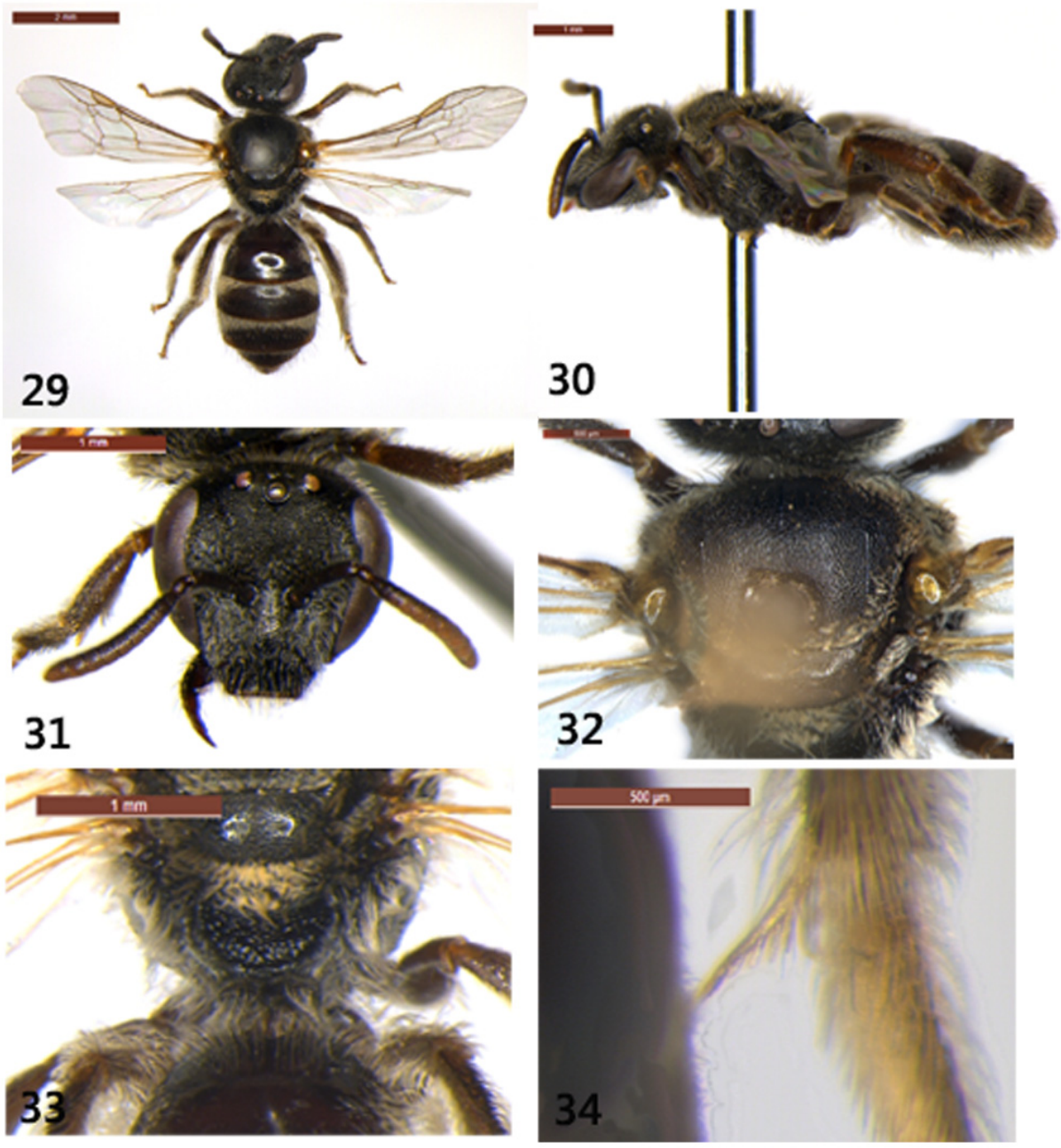
Figs. 11-16 Female. *Halictus* (*Seladonia*) *propinquus*, 11- Dorsal habitus; 12- Lateral habitus; 13- Head; 14-Thorax; 15-Propodeum; 16-Hind tibial spur teeth



Figs. 17-22 Female. *Lasioglossum* (*Ctenomia*) *albescens*, 17-Dorsal habitus; 18- Lateral habitus; 19- Head; 20-Thorax; 21- Propodeum; 22- Hind tibial spur teeth



Figs. 23- 28 Female. *Lasioglossum* (*Ctenomia*) *cavernifrons*, 23-Dorsal habitus; 24- Lateral habitus; 25- Head; 26-Thorax; 27-Propodeum; 28-Hind tibial spur teeth



Figs. 29- 34 Female. *Lasioglossum* (*Ctenomia*) *sikkimense*, 29- Dorsal habitus; 30- Lateral habitus; 31- Head; 32-Thorax; 33- Propodeum; 34- Hind tibial spur teeth.

ridges on sides, wrinkled stripes in middle (Fig. 27); lateral propodeal field smooth and shining; tegula finely punctured; wings milky water-white, veins brown in colour; WL-5.91mm.

Metasoma (Fig. 23): is black brown, elongated egg-shaped, curved; tergum smooth, shining with very sparse and fine punctures; apical parts of legs more or less black, T1 not punctured,shiny; T2 and T3 with silky white hair band at the base with bands interrupted in middle; inner hind tibial spur with 3 teeth (Fig. 28).

Flower record: Lemon

***Lasioglossum* (*Ctenomia*) *sikkimense* (Blüthgen, 1926) (Figs. 29-34)**

Halictus sikkimensis Blüthgen, 1926: 586

Diagnosis: *Lasioglossum* (*Ctenomia*) *sikkimense* can be distinguished from other *Ctenomia* species by the following: size small; body brown black; Wingtransparent; reticulated ridges in middle on base of propodeum.

Coloration: body color brown black; hair bands on tergites T1-T3 pale white hair band; wing clear transparent; veins and spots yellowish brown; flagella ventrally reddish brown; tegula lightbrown colored; legs reddish brown; hairs on the legs pale white.

Structure: BL- 6.26mm

Head (Fig. 31): almost as long as wide; vertax flat; frons rough, densely punctured; HW- 1.65mm; HL- 1.62mm; EL- 1.11mm; CL- 0.39mm, CW- 0.49mm, IOD- 0.35mm clypeus complete black, punctured; paraoccular area, area near clypeus with white hair; mandible black with pre-apical tooth; flagella ventrally light brown.

Mesosoma (Fig. 32): scutum and scutellum not shiny, with irregular dense punctures; basal

propodeum with reticulated ridges in middle, edged on sides (Fig. 33); lateral Propodeal covered with hairs; tegula finely punctured; wings transparent, veins brown in color; WL- 4.11mm.

Metasoma (Fig. 29): chestnut brown, longer, elongated, oval shape; tergum smooth, shiningwith very sparse and fine punctures; apical parts of legs more or less black, T1 glossy, pale white lateral hair spot, T2 and T3 at the base with broad hair bands, T3 interrupted in middle; T4 and T5 with brown color hair bands; inner hind tibial spur with 4 teeth (Fig. 34).

Flower record: Cabbage, maize

***Lasioglossum* (*Ctenomia*) *splendidulum* (Vachal, 1895) (Figs. 35-40)**

Halictus splendidulus Vachal, 1895: 432

Halictus proteus Vachal, 1895: 438

Halictus semiaerinus Vachal, 1895: 443; Blüthgen, 1926: 611, 654

Halictus metenus Cockerell, 1937: 4; Ebmer, 1998: 376

Halictus (Evylaeus) bambusarum Cockerell, 1937: 10; Ebmer, 1998: 376

Halictus (Chloralictus) speculibasis Cockerell, 1937: 11; Ebmer, 1998: 376

Diagnosis: *Lasioglossum* (*Ctenomia*) *splendidulum* can be distinguished from other *Ctenomia* species by the following: size medium to large; body color black; finely punctuate; wings pale white; propodeun not carinate; less irregular oblique ridges reaching up to mid-length of basal propodeum.

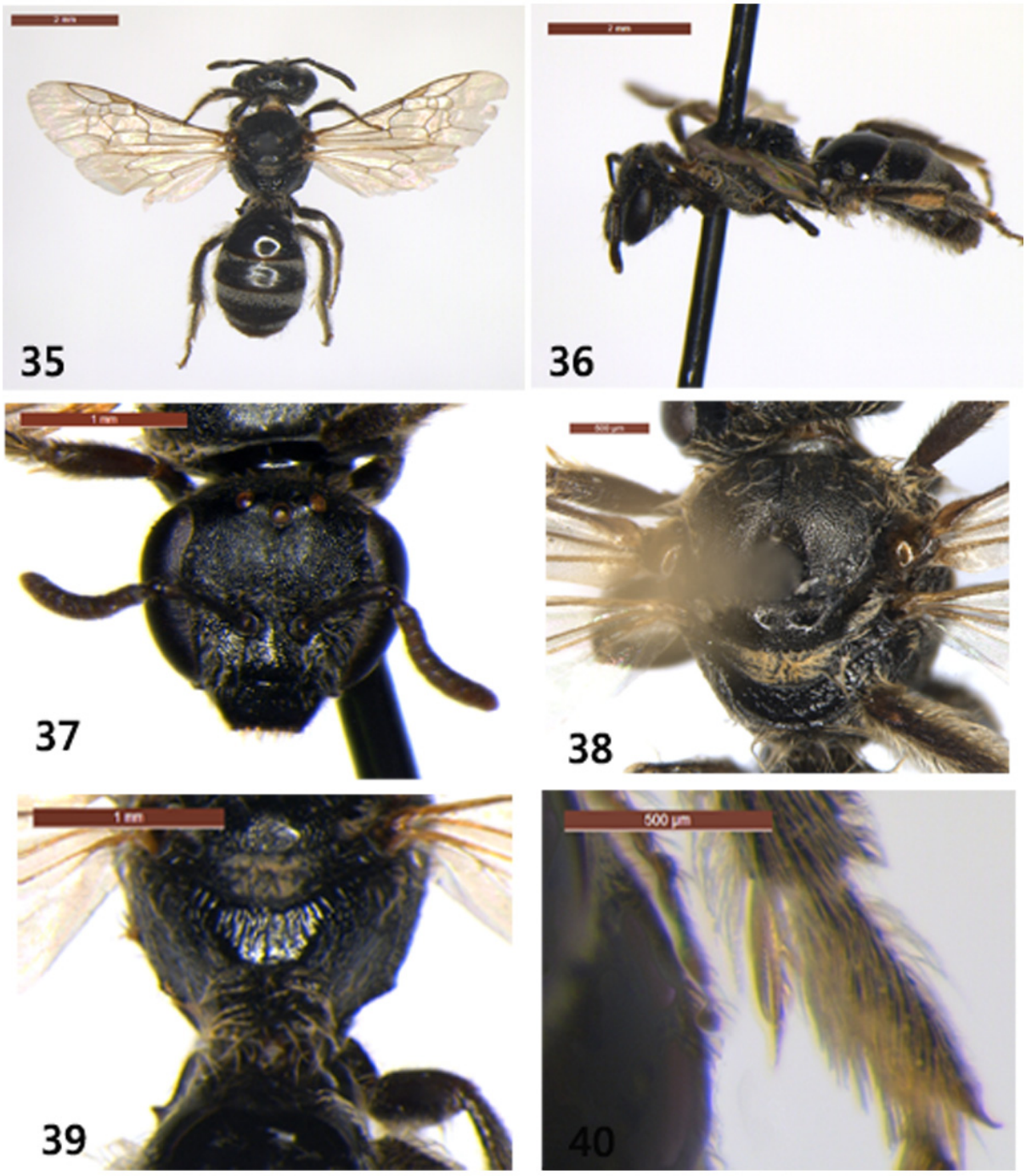
Coloration: body color shiny brown black; T2-T5 white hair band; wings pale white; veins.

and spots dark brown; flagella ventrally dark brown; tegula chestnutbrown colored; hairs on the legs white.

Structure: BL- 6.17mm

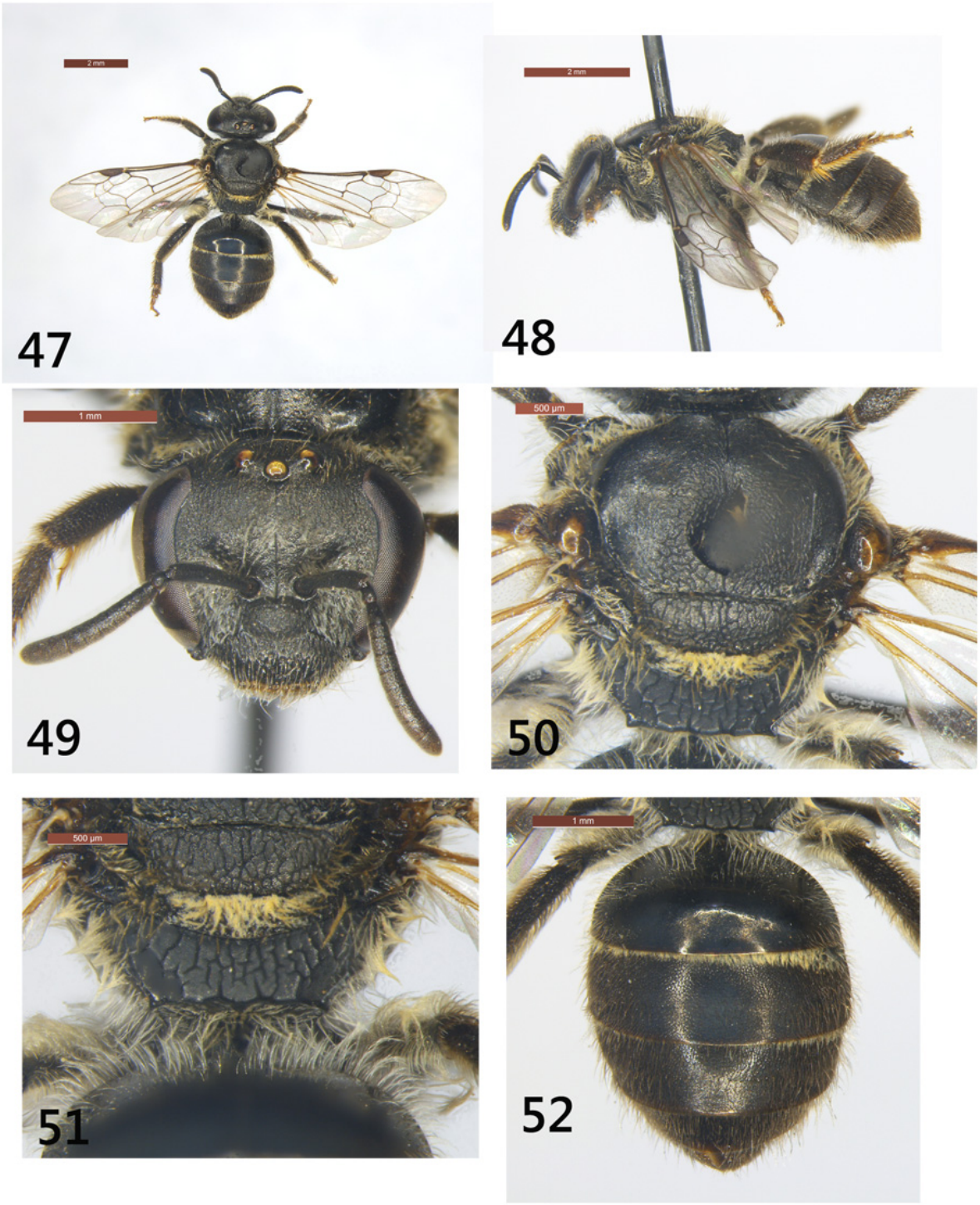
Head (Fig. 37): little wider than thorax; wider than long; HW- 1.62mm; HL- 1.46mm; EL- 1.06mm; CL- 0.27mm, CW- 0.41mm, IOD- 0.32mm clypeus brown black, shiny, sparsely punctured; area near clypeus with sparsely white hair; flagella ventrally brown.

Mesosoma (Fig. 38): scutum and scutellum shiny,

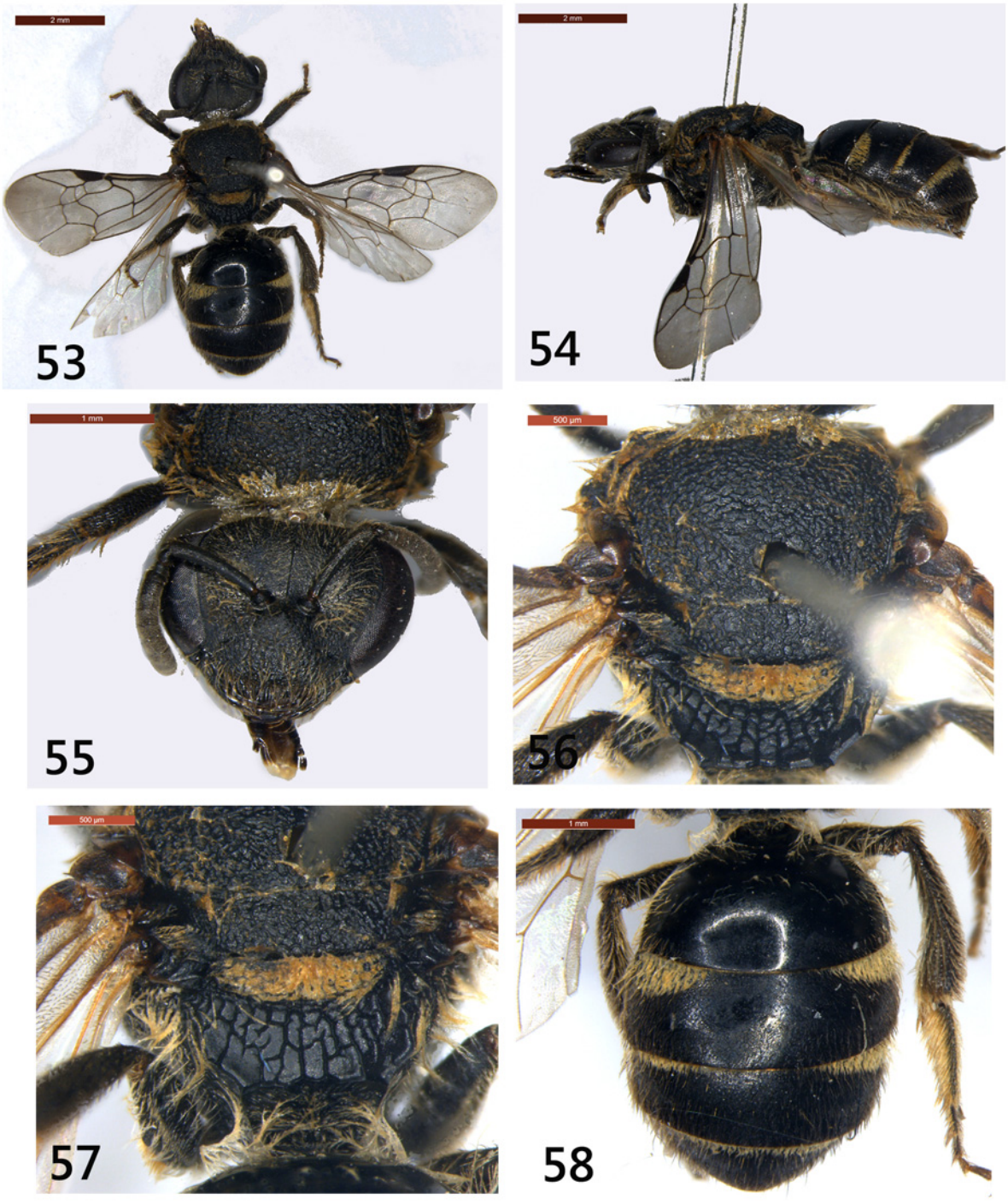


Figs. 35- 40 Female. *Lasioglossum* (*Ctenomia*) *splendidulum*, 35-Dorsal habitus; 36- Lateral habitus; 37- Head; 38-Thorax; 39-Propodeum; 40-Hind tibial spur teeth

Figs. 41- 46 Female. *Lasioglossum* (*Ctenomia*) *vagans*, 41-Dorsal habitus; 42- Lateral habitus; 43- Head; 44-Thorax; 45-Propodeum; 46- Hind tibial spur teeth



Figs. 47- 52 Female. *Patellapis* (*Pachyhalictus*) *liodoma*, 47- Dorsal habitus; 48- Lateral habitus; 49- Head; 50-Thorax; 51- Propodeum; 52-Abdomen



Figs. 53- 58 Female. *Patellapis* (*Pachyhalictus*) *reticulosa*, 53-Dorsal habitus; 54- Lateral habitus; 55- Head; 56-Thorax; 57-Propodeum; 58-Abdomen

with extremely fine, flat dots, in the middle distributed irregularly and more or less is scattered; basal propodeum with oblique ridges on the sides and less irregular in middle reaching up to mid length of basal propodeum (Fig. 39); lateral Propodeal field smooth and shining; tegula finely punctured; wings milky water-white, veins brown in color; WL- 5.91mm.

Metasoma (Fig. 35): black brown, elongated egg-shaped, curved; T1 smooth, shining with very sparse and fine punctures, T2,T3 and T4 with silky white hair band at the base with bands not interrupted in middle; apical parts of legs more or less black; inner hind tibial spur with 3 teeth (Fig. 40).

Flower record: Cabbage, maize

***Lasioglossum* (*Ctenomia*) *vagans* (Smith, 1857) (Figs. 41-46)**

Halictus vagans Smith, 1857: 42; Dalla Torre, 1896: 89; Blüthgen, 1931b: 327; Yasumatsu, 1935: 385; Baltazar, 1966: 367-368

Halictus cattulus Vachal, 1895: 437; Dalla Torre, 1896: 57; Blüthgen, 1926: 393; Blüthgen, 1926: 652, 670, 672; Blüthgen, 1930a: 72

Halictus cattulus var *peguanus* Vachal, 1895: 437; Blüthgen, 1926: 654

Halictus buddha Cameron, 1897: 107; Blüthgen, 1930a: 74

Halictus vishnu Cameron, 1897: 106; Blüthgen, 1930a: 74

Halictus phillipinensis Ashmead, 1904b: 128; Blüthgen, 1926: 416

Halictus matheranensis Cameron, 1907a: 1001; Blüthgen, 1930a: 77

Halictus emergendus Cameron, 1908a: 311; Blüthgen, 1926: 654

Halictus luteitarsellus Strand, 1910: 206; Blüthgen, 1926: 654

Halictus micado Strand, 1910: 204; Blüthgen, 1922: 54; Blüthgen, 1926: 386, 397

Halictus nasicensis Cockerell, 1911: 191; Blüthgen, 1926: 654

Halictus perhumilis Cockerell, 1911a: 192; Blüthgen, 1931b: 327

Halictus statialis Cockerell, 1911d: 667; Strand, 1913a: 29; Blüthgen, 1922: 63; Blüthgen, 1926: 386 [Notes]; Sonan, 1940: 375

Halictus bleharophorus Strand, 1913: 28; Blüthgen, 1923b: 242

Halictus centrophorus Strand, 1913c: 140; Blüthgen, 1926: 399

Halictus nalandicus Strand, 1913c: 140; Blüthgen, 1926: 399

Halictus javanicus Friese, 1914: 23

Halictus schmiedeknechti Friese, 1914: 24; Blüthgen, 1922: 56

Halictus phillipinensis var nigritarsellus Cockerell, 1919c: 274; Blüthgen, 1926: 407.

Halictus chaldaeorum Morice, 1921: 826; Blüthgen, 1922: 319; Cockerell, 1924a: 585; Blüthgen, 1926: 386

Halictus semivagans Cockerell, 1937: 5

Lasioglossum (*Ctenonomia*) *vagans* Pesenko, 1986: 121; Sakagami, 1989: 509; Ebmer, 1998: 377; Ebmer, 2004: 140

Diagnosis: *Lasioglossum* (*Ctenomia*) *vagans* can be distinguished from other *Ctenomia* species by the following: size small; body color brown black; sparsely punctuate; wings hyaline; propodeum carinate; irregular oblique ridges on basal propodeum.

Coloration: body color shiny black; metasoma chestnut brown; T2-T5 white hair band; wings hyaline; veins and spots brown; flagella ventrally brown; tegula light brown; legs yellow on tarsi;hairs on the legs white.

Structure: BL- 6-7mm

Head (Fig. 43): wider than long; finely punctured; HW- 1.77mm; HL- 1.53mm; EL- 1.20mm; CL- 0.31mm, CW- 0.50mm, IOD- 0.32mm clypeus brown black, shiny, punctured; paraoccular area, area near clypeus with sparsely white hair; flagella ventrally brown; mandible reddish brown apically.

Mesosoma (Fig. 44): scutum and scutellum not much shiny, with extremely fine, uniformly and more or less is scattered punctation; basal propodeum with irregular oblique ridges on basal propodeum (Fig. 45); lateral Propodeal field smooth and shining; tegula finely punctured; wings hyaline, sometimes brownish tint; veins brown in color; WL-4.27mm.

Metasoma (Fig. 41): is chestnut brown, elongated oval shaped; T1 glabrous, shining with fine punctures, T2-T5with white hair band at the base, T2 band interrupted in middle; apical parts of legs yellow; inner hind tibial spur with 3-4 teeth or 3 long teeth (Fig. 46).

Flower record: Cabbage, maize

Genus – *Patellapis*

***Patellapis* (*Pachyhalictus*) *liodoma* (Vachal, 1895) (Figs. 47-52)**

Halictus liodomus Vachal, 1895: 435

Pachyhalictus (*Pachyhalictus*) *liodomus* (Vachal, 1895); Michener, 1978: 518

Halictus scopipes Friese, 1918

Diagnosis: *Patellapis* (*Pachyhalictus*) *liodoma* can be distinguished from other *Pachyhalictus* species by the following: pronotum protruding side corners; scutum with net structure in middle, smooth on sides; mesonotum with central strong furrow.

Coloration: body color matt black; pubescence pale yellow; wings hyaline; veins light brown; flagella ventrally dark brown; tegula brown ; legs dark brown,light brown on tarsi; hairs on the legs yellow; clypeus brown black; eyes dark brown; mandible dark brown apically.

Structure: BL- 8-9mm

Head (Fig. 49): wider than long; rough; HW- 2.21 mm; HL- 1.83mm; EL- 1.40mm; CL- 0.40mm, CW- 0.75mm, IOD- 0.33mm, rough; paraoccular area, frons, finely reticulated; area near clypeus with sparsely white hair; frontal carina present.

Mesosoma (Fig. 50): pronotum projected side corners dorso-laterally; scutum with net structure in middle, smooth on sides; mesonotum with central strong furrow; basal propodeum with less reticulated sculpture, ridges with carina (Fig. 51).

Metasoma (Fig. 52): oval shaped; Hind basitibial plate pointed apically; T1 impunctate or sparsely punctuate in middle, glabrous, T2- T5 strongly punctuate, T2 punctate.

Patellapis (Pachyhalictus) reticulosa (Dalla Torre, 1896) (Figs. 53-58)

Halictus reticulatus_homonym Vachal, 1895.

Halictus reticulosus Dalla Torre, 1896:80.

Pachyhalictus (Pachyhalictus) reticulosa (Dalla Torre, 1896);

Michener, 1978: 518; Pesenko & Wu, 1997:288; Michener, 2000:370

Diagnosis: *Patellapis* (*Pachyhalictus*) *reticulosa* can be distinguished from other *Pachyhalictus* species by the following: size medium to large; body color matt black; rough head and thorax regulate; wings hyaline; propodeun carinate; strongly reticulate on basal propodeum.

Coloration: body color matt black; pubescence pale yellow;T2-T5 yellow hair band; wings hyaline; veins and spots dark brown to black; flagella ventrally brown; tegula brown ; legs brown on tarsi; hairs on the legs yellow.

Structure: BL-6.81mm.

Head (Fig. 55): as long as wide with tiny dense reticulation; HW-2.11mm;HL-2.10mm;EL-1.35mm;CL-1.26 mm; CW- 0.70mm; IOD-1.23mm;surface of supraclypeal area extensively reticulate; clypeus lack, punctured; area near clypeus with sparsely yellow hair; flagella ventrally black; mandible brown.

Mesosoma (Fig. 56): scutum extensively, irregular reticulation; tegula smooth, posteriorly impunctate; metanotum with dense pubescence basal propodeum shiny with strong, wider reticulate ridges;wings hyaline; veins dark brown in color; WL- 4.12mm.

Metasoma (Fig. 58): short, cylindrical; T1 glabrous at middle, T2 to T4 with lateral basal hair band interrupted medially; hind femur with long,

branched, pale and ventrally curved hairs; apical parts of legs more or less black.

Flower record: Dianthus and maize

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