

A taxonomic review of subgenus *Andrena* (*Sauandrena*) from India

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ABSTRACT

Andrena (*Sauandrena*) subgenus of genus, *Andrena* is represented in India by a single species *savigneyi* Spinola, 1838. The male and female of this species has been redescribed with additional characters and illustrations.

Key words : *Andrena*, *Sauandrena*, India.

INTRODUCTION

Order Hymenoptera with more than 1, 15,000 described species worldwide includes around 17,000 species of bees under Superfamily Apoidea (Michener, 2000). The family Andrenidae is currently represented by 4 subfamilies and 5 genera with about 1443 valid species worldwide (Gusenleitner and Schwarz, 2002). The only comprehensive work on Indian bees was that of Bingham (1897) who included all the different types, viz., social/non social bees under a single family Apidae and used characters like shape of the tongue, nature of pubescence on the body and integument colour for their segregation. Hence, there was a need of review and redescribe the subgenera and the species under them. Subgenus *Andrena* (*Sauandrena*) was erected by Warncke in 1968, based on the type species *Andrena suerinensis* Friese, 1884. In India, subgenus *A.* (*Sauandrena*) is represented by only one species that is *A. savigneyi* Spinola, 1838. The subgenus along with its lone species has been redescribed in this communication based on both male and female specimens. Further several new distribution records and a new floral record have also been established for this species.

MATERIALS AND METHODS

The specimens studied were collected from the mustard fields during November - December 2012 till March 2013 from different states of north India. The specimens were suitably processed for taxonomic studies. Also the identified specimens

present in the National Pusa Collection (NPC) were studied. New distribution as well as floral records has been marked with *. All the specimens have been deposited in NPC.

Morphological studies were conducted under a Leica MZ 12 stereozoom microscope. Measurements were made using stage and ocular micrometers while line drawings were made using a drawing tube attached to a Leica MZ 12 stereoscopic microscope. Photography was done with LEICA DFC 425C stereo-zoom microscope using LAS3.8 software. All the illustrations as well as the photographs were processed with Adobe Photoshop 7.0.

The following morphological measurements were taken and used in the taxonomic descriptions: Body Length: Complete body length in lateral view (head + thorax + abdomen). Length of head: Distance from hind margin of vertex to the front (lower) margin of the clypeus in frontal view. Width of head: greatest distance between outer margins of compound eyes in frontal view. UICD: Distance between upper inner margins of compound eyes. LICD: Distance between lower inner margins of compound eyes. Length of clypeus: Shortest distance between upper (hind) and lower (anterior) margin of clypeus in frontal view. Width of clypeus: Greatest distance between lateral margins of clypeus in frontal view. Length of PLR: Greatest distance between basal margin of labrum and apical margin of PLR. Width of PLR: Measurement of widest distance between lateral margins of PLR taken basally. Length of FOV: Distance between upper and lower margin of FOV. Width of FOV:

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Greatest distance between inner and outer margin of FOV. Length of AS: Greatest distance between basal and distal end of segment. FWL: Distance between base of vein R to distal end of wing.

Morphological terms used in this paper mainly followed those of Michener (2007). Abbreviations used are as follows: AS: antennal segment (scape = AS1 and so on), BL: body length, FWL: length of forewing, FOV: facial fovea, DLP: dorsal part of lateral propodeum, LP: lateral part of propodeum, LICD: lower inter compound eye distance, UICD: upper inter compound eye distance, PMX: maxillary palpus (PMX1: basal segment of PMX and so on), PLB: labial palpus, PLR: process of labrum, PT: propodeal triangle, S: metasomal sternum and T1, T2 etc. : metasomal tergum.1, metasomal tergum 2 and so on.

RESULTS AND DISCUSSION

Subgenus *Sauandrena* of genus *Andrena* is represented in India by a single species viz., *savigneyi* Spinola, 1838. This species was previously described from India by Cameron as *A. ilerda* in 1907 and as *ferozeporensis* in 1909; and as *ilerda inglisi* by Cockerell in 1920 which were all later synonymised by Ascher and Pickering, 2013 under the species name *savigneyi* Spinola.

Subgenus *Sauandrena*

Diagnosis :

Female : Medium sized bees ranging between 13-14 mm. Facial fovea long; upper part broad, lower part narrow, strongly depressed, upper part extending beyond compound eyes. PLR with deep triangular emargination apically. Propodeal triangle with upper 1/3rd basally weakly finely wrinkled, apical 2/3rd strongly tessellated. Flocculus of hind trochanter complete. Tibial scopa long, dense, upper half yellow, lower half white, bilaterally branched pubescence. Hind tibial spur basally broadened distinctly. FOV on T2 distinctly present. Basal 2 to 3 abdominal segments red. Prepygidial and pygidial fimbriae blackish. Pygidial plate triangular with raised triangular area medially.

Male : Medium sized bees ranging between from 10 - 11.5 mm. PLR rectangular with deep emargination medially and apically. Clypeus black, shiny, with widely spaced distinct punctation. Propodeal triangle dull, basal half more coarsely rugose, apical half finely

rugose. Inner hind tibial spurs basally broadened, apex straight and pointed. T2 red, remaining black. Pygidial plate triangular with raised triangular area medially, narrow marginal area, apex truncate; S8 basal part wide, apical narrow, deep emargination at apex of S8 absent; dorsal lobe of gonocoxite apically pointed. Gonoforceps about as broad as dorsal lobe with ventral margin distinctly narrower than basal part.

Andrena (Sauandrena) savigneyi Spinola, 1838

Andrena ilerda Cameron, 1907:1001.

Andrena ferozeporensis Cameron, 1909:131.

Andrena ilerda inglisi Cockerell, 1920:133.

Diagnosis : Female (Fig. 1, Plate I)

BL : 13.593 ± 0.385 mm.

Head : Oval, 1.34x wider than long. Mandibles long, falcate, bidentate. PLR triangular with shallow triangular emargination apically; PLR W/L = 2.79; UICD/LICD = 0.95. Apex of galea rounded, slightly convex on outer margin; PMX distinctly shorter than galea; PMX2 longer than PMX1; glossa short, labial palpi longer than glossa. Clypeus convex, polished, with weak sparse punctation, 1.8x broader than long with distinct punctation. Frontal line present and well developed. Genal area wider than width of compound eye, punctation present; malar space well developed. FOV long, wide posteriorly becoming narrowing anteriorly, parallel sided reaching below lower margin of antennal insertion to nearly hind margin of lateral ocelli, 3.8x longer than wide, depressed. Smooth area present between compound eyes and facial fovea. AS3/AS1 = 0.72. Hind margin of vertex rounded. Vertex weakly shiny.

Mesosoma : Pronotum shiny, without humeral angle. Scutum dull, tessellate with dense punctation; scutellum dull in lower half part remaining upper part shiny with dense punctation; metanotum dull, strongly tessellated. PT finely rugose, areolated, punctured and meet at propodeal vertical furrow. Propodeum with a slight declivous upper part while lower part strongly declivous. Forewing with three submarginal cells, basal vein straight and greyish in color. Hind inner tibial spurs basally strongly broadened, pointed apically; tibia and basitarsus slender; claws apically bidentate.

Metasoma : Pygidial plate narrower at apex and wider basally, median triangular raised area present. Fovea on T2 present.

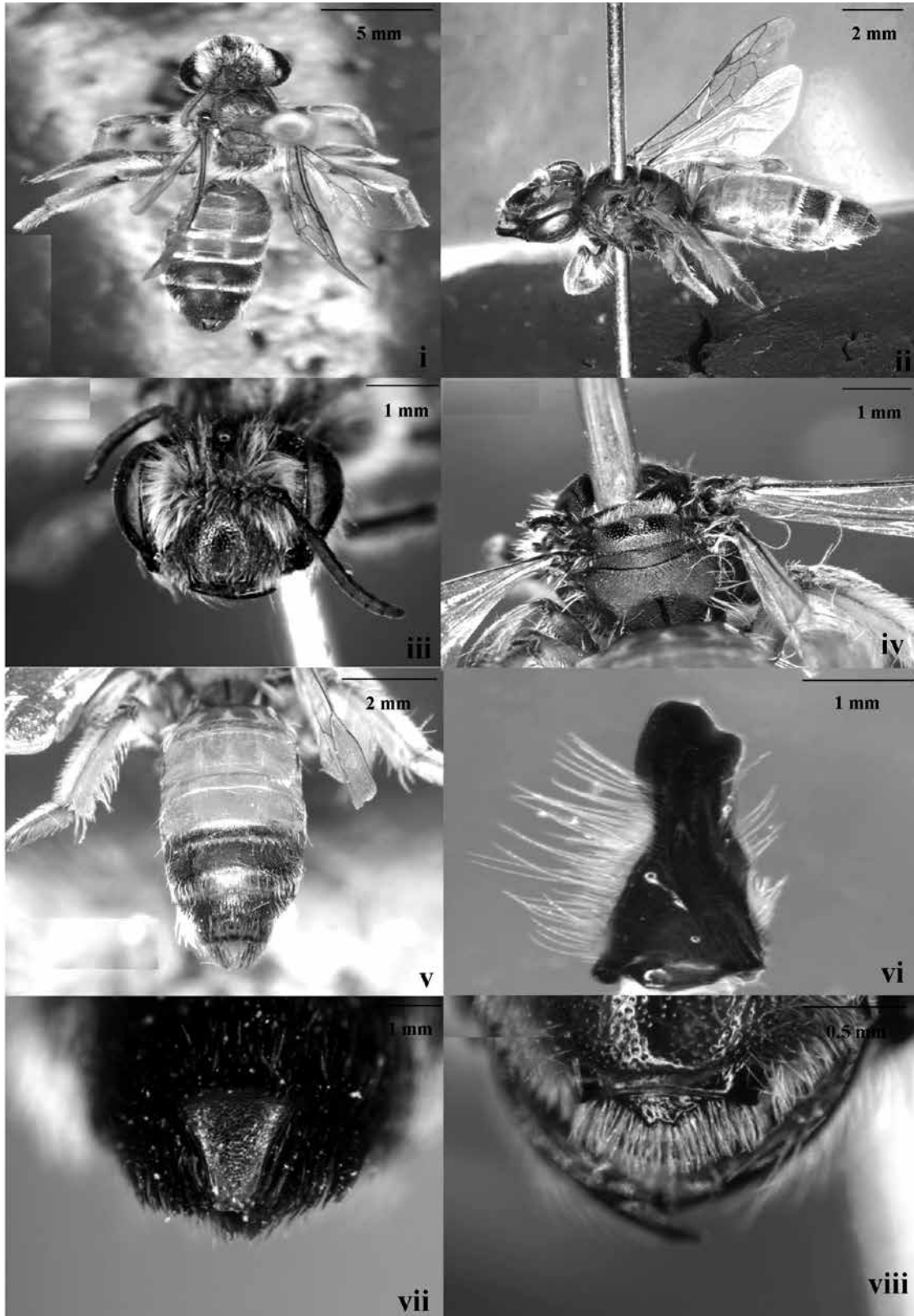


Plate I. *Andrena savigneyi* Spinola (female): (i) dorsal habitus, (ii) lateral habitus, (iii) head frontal view, (iv) propodeal triangle, (v) dorsal view of metasoma, (vi) mandible, (vii) pygidial plate and (viii) process of labrum.

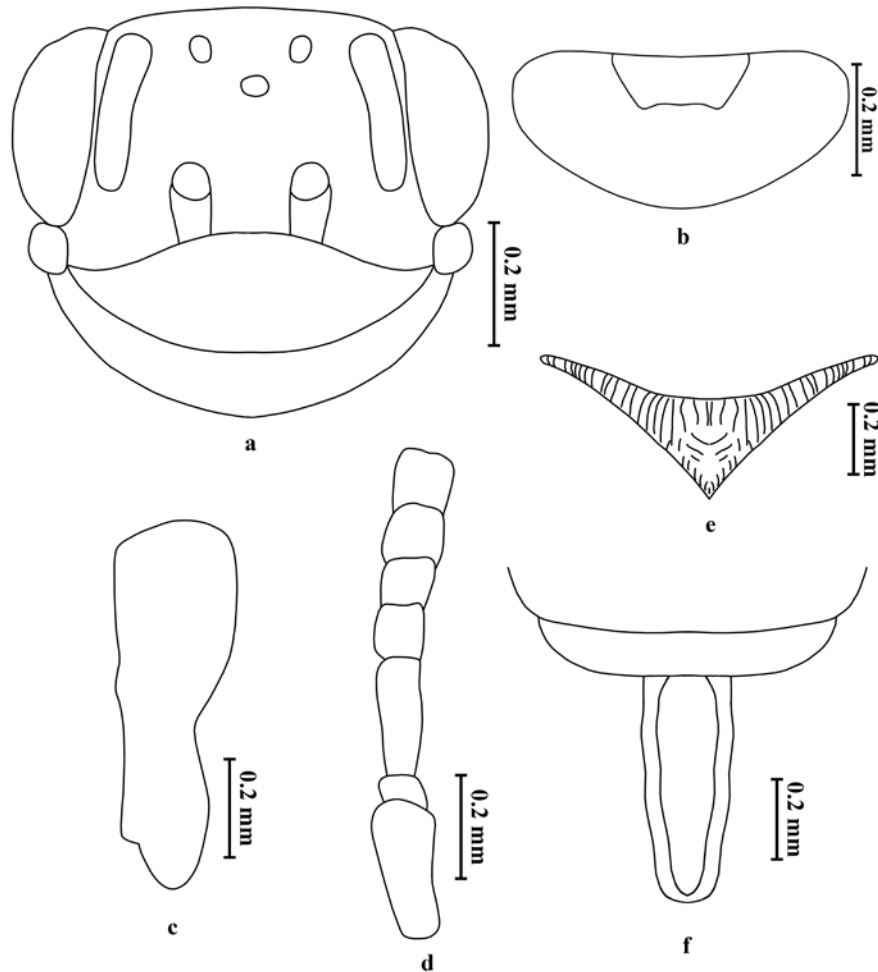


Fig. 1. *Andrena savigneyi* Spinola (female): (a) head, (b) process of labrum, (c) mandible, (d) antenna, (e) propodeal triangle and (f) pygidial plate.

Integument color : Mandibles black, apically reddened. Cardo honey yellow, stipes dark reddish brown. Scape and pedicel black, flagellum reddish brown. Clypeus honey yellow apically, black basally. PLR honey yellow bordered with black. All other parts of head, as well as thorax black. Tegulae brownish, transparent. Legs honey yellow. T2-T3 honey yellow remaining black. Sterna honey yellow. Pygidial plate with bright reddish triangular area in the middle with blackish brown margin.

Pubescence : Vertex with sparsely distributed long greyish hairs, head as well as scape with dense, long silvery white pubescence. FOV whitish brown. Clypeus with long silvery white hairs along the border, middle part with sparsely distributed pubescence. Pubescence of galeal blade, glossa, stipes and lacinia of straight hairs. Hairs on stipes

sparse. Thorax with long silvery white hairs. Metasomal hair bands complete. Prepygidial and pygidial fimbria greyish brown. Hairs of front, middle and hind legs golden yellow. Trochanter floccus of hind leg of long silvery white hairs. Femoral and tibial scopa golden yellow. S2-S5 with conspicuous short, sparse hairs on disc and medium long to long white hair fringe along apical margin.

Diagnosis : Male (Fig. 2, Plate II)

BL : 10.665 ± 0.615 mm.

Head : Oval, 1.3x wider than long. Mandibles bidentate and falcate. PLR shiny, trapezoidal with triangular emargination apically. PLR W/L = 2.69. UICD/LICD = 1.03. Apex of galea rounded, convex on outer margin. PMX slightly longer than galea. PMX2 longer than PMX1. Glossa short,

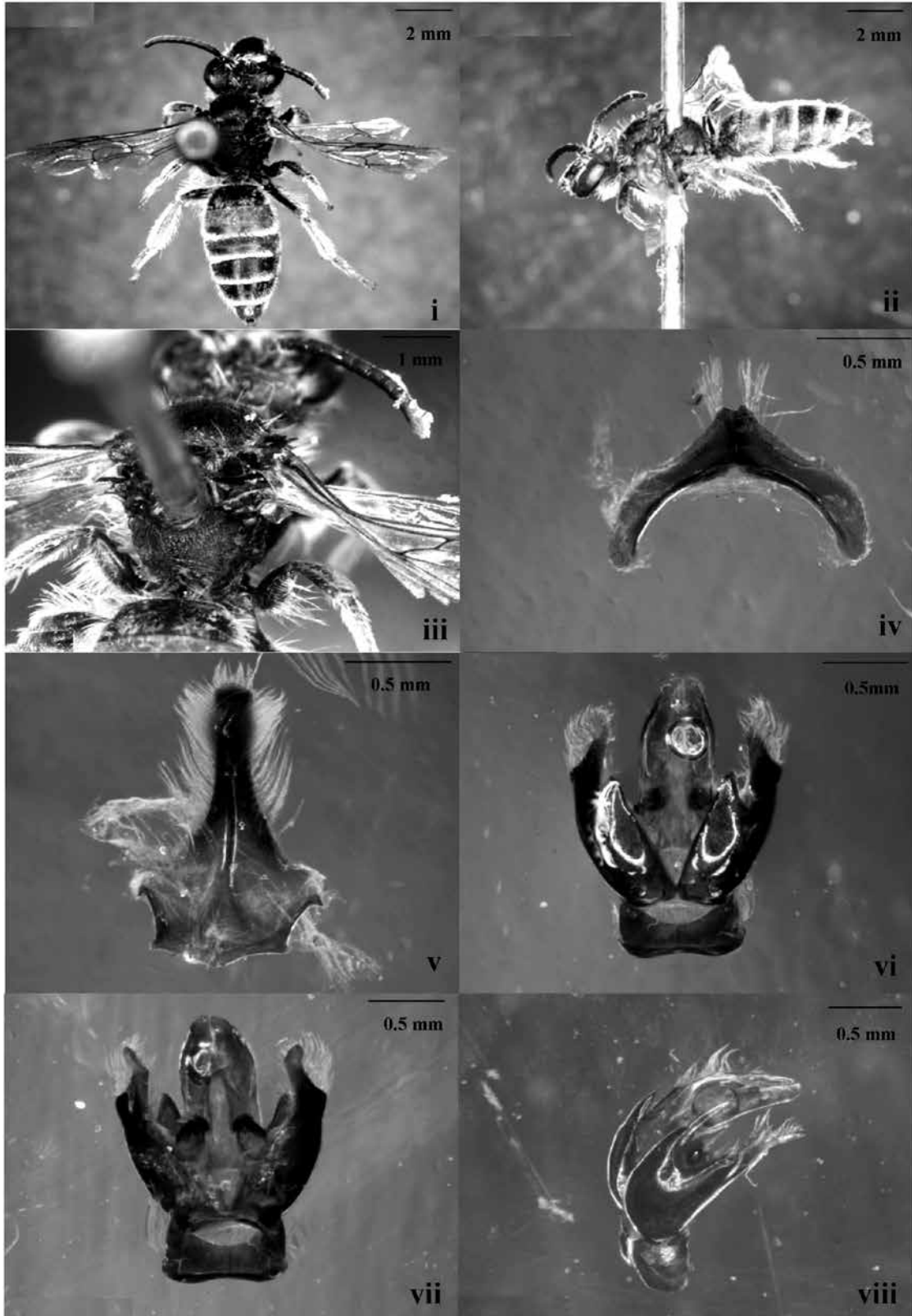


Plate II. *Andrena savigneyi* Spinola (male): (i) dorsal habitus, (ii) lateral habitus, (iii) propodeal triangle, (iv) S7, (v) S8, (vi) genitalia dorsal view, (vii) genitalia ventral view and (viii) genitalia lateral view.

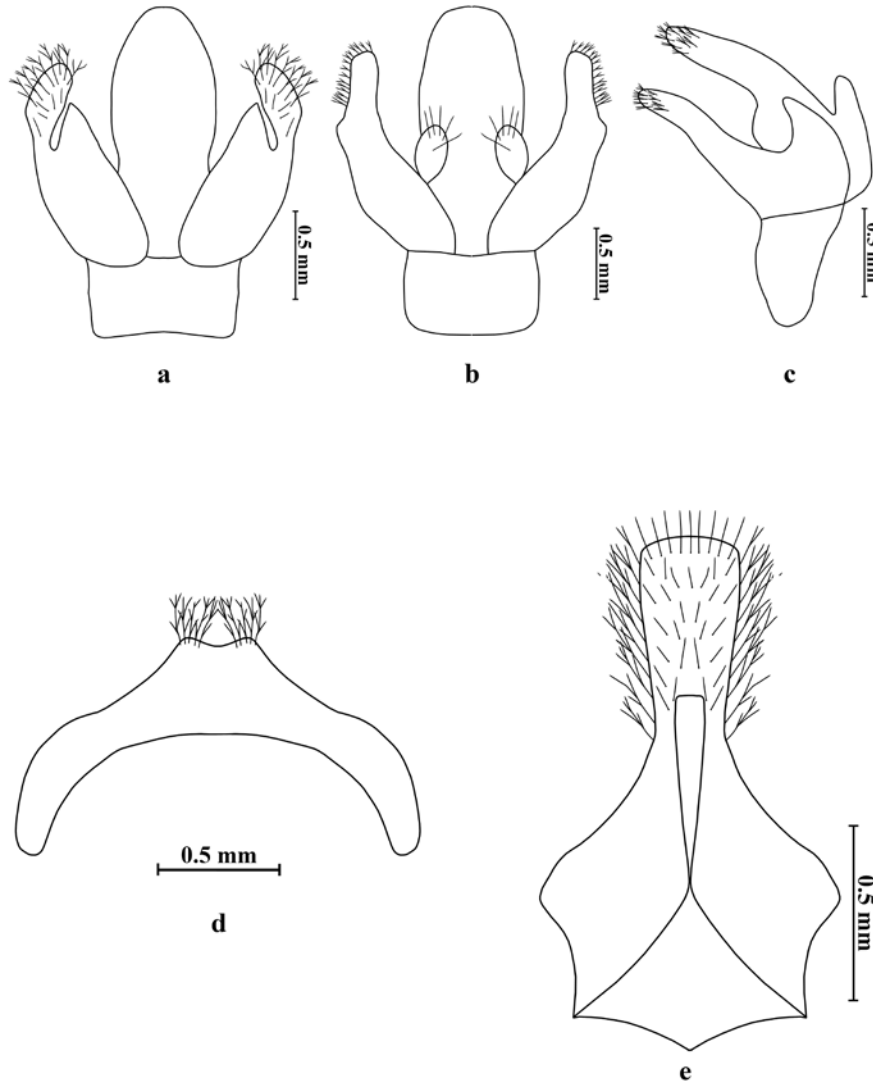


Fig. 2. *Andrena savigneyi* Spinola (male): (a) genitalia dorsal view, (b) genitalia ventral view, (c) genitalia lateral view, (d) S7 and (e) S8.

labial palpi as long as glossa. Clypeus 1.2x wider than long and tessellate, disc convex, with dense punctation. $AS3/AS1 = 0.50$. Hind margin of vertex rounded.

Mesosoma : Pronotum shiny, without humeral angle. Scutum dull, strong and densely tessellate with distinct punctation; scutellum shiny anteriorly, strongly tessellate and dull with indistinct punctation posteriorly; metanotum dull to weakly shiny, rugously tessellate, basally weakly wrinkled. PT dull, finely rugose; areolated. DLP, LP, as well as declivous part of propodeum weakly rugose tessellate and dull. Mesepisternum rugously tessellated, dull to weakly shiny with distinct honeycombed wrinkles.

Legs slender, claws bidentate. Hind inner tibial spurs basally broadened, pointed apically. Wings same as in female.

Metasoma : Abdominal tergum smooth and shiny with inconspicuous small, dispersed punctation. Pygidial plate distinctly developed, triangular raised area medially, narrower at apex and wider basally and declivous. S7 homogenously fused, apex with two distinct apical lobes with pointed apex. S8 flat in profile, process apically broadened without deep emargination. Inner margins of gonocoxite nearly completely separated by penis valve. Dorsal lobe of gonocoxite developed, apical margin pointed, inner margin of dorsal lobe parallel sided. Gonoforecepts

about as broad as dorsal lobe with ventral margin distinctly narrower than basal part in profile, inner margin of apical part of gonoforceps straight to slightly concave without any emargination. Shape of penis valve more or less triangular, becoming narrower apically, distinctly greater than gonoforceps, apex of penis valve (dorsal view) rounded.

Integument colour : Mandibles black basally, reddened apically. Clypeus completely black. All other parts of head, as well as thorax black. Scape and pedicel black; flagellum reddish brown on both sides. Tegulae transparent brown. Legs honey yellow. T1 black, T2 reddish, remaining segments black ventrally as well dorsally. Pygidial plate bright reddish, triangular area in the middle with blackish brown margin.

Pubescence : Vertex with sparsely distributed long greyish hairs, head as well as scape with dense, long silvery white pubescence of branched hairs. Clypeus with long silvery white hairs along the margin; middle part with sparsely distributed pubescence. Tergum and sternum with long silvery white pubescence. Propodeal corbicula present with plumose hairs, Lateral propodeum and remaining propodeum with regular dense pubescence of long whitish branched hairs.

Measurements (in mm) : ♀: BL: 13.593 ± 0.385; FWL: 7.365 ± 0.062; Head Length: 2.295 ± 0.159; Head Width: 3.263 ± 0.169; Clypeus Length: 1.078 ± 0.049; Clypeus Width: 1.927 ± 0.134; UICD: 2.192 ± 0.049; LICD: 2.212 ± 0.226; PLR Length: 0.171 ± 0.006; PLR Width: 0.473 ± 0.011; Length of AS1: 0.570 ± 0.063; AS2: 0.154 ± 0.005; AS3: 0.443 ± 0.036; AS4: 0.160 ± 0.007; AS5: 0.176 ± 0.009; FOV Length: 1.382 ± 0.035; FOV Width: 0.355 ± 0.007.

♂: BL: 10.665 ± 0.615; FWL: 6.540 ± 0.431; Head Length: 2.452 ± 0.027; Head Width: 2.904 ± 0.081; Clypeus Length: 0.964 ± 0.007; Clypeus Width: 1.500 ± 0.014; UICD: 2.113 ± 0.026; LICD: 2.013 ± 0.063; PLR Length: 0.157 ± 0.007; PLR Width: 0.429 ± 0.031; Length of AS1: 0.599 ± 0.012; AS2: 0.214 ± 0.010; AS3: 0.278 ± 0.023; AS4: 0.281 ± 0.012; AS5: 0.268 ± 0.010.

Specimens examined : INDIA: 3 ♀♀, Rajasthan: Kota, 30.XI.2012, on *Brassica campestris*, Lokesh coll.; 4 ♀♀, Rajasthan: Kota, 01.XII.2012, Lokesh coll.; 5 ♀♀, Rajasthan: Kota, 03.XII.2012, on *Datura stramonium*, Lokesh coll.; 5 ♀♀: New Delhi: IARI,

07.III.2013, Lokesh coll.; 1 ♀, INDIA: Punjab: Lyallpur, 11.XII.1911, (NPC); 1 ♀, INDIA: Punjab: Lyallpur, 25.XII.1911, (NPC); 2 ♂♂, INDIA: Rajasthan: Kota, 30.XI.2012, on *Brassica campestris*, Lokesh coll.; 2 ♂♂, Rajasthan: Kota, 02.XII.2012, on *Brassica campestris*, Lokesh coll.; 4 ♂♂, Rajasthan: Kota, 05.XII.2012, *Brassica campestris* Lokesh coll.

Distribution : India : Gujarat, Rajasthan*, Delhi*; Pakistan* : Punjab : Lyallpur.

Floral record : *Brassica campestris*, *Datura stramonium**

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(Accepted : April 10, 2015)