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A Revision of the Subgenus *Cnemidandrena* of the Genus *Andrena* of Eastern Asia (Hymenoptera, Andrenidae)^{1), 2), 3)}

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Abstract. The subgenus *Cnemidandrena* of the genus *Andrena* of eastern Asia is revised, and 14 species, two of them are divided to two subspecies respectively, are recognized. Six new species, *Andrena* (*Cnemidandrena*) *gobi*, *A.* (*Cnem.*) *hedini*, *A.* (*Cnem.*) *gusenleitneri*, *A.* (*Cnem.*) *granulitergorum*, *A.* (*Cnem.*) *gigantimurus*, and *A.* (*Cnem.*) *solidago* are described from China and Japan. A key to species of *Cnemidandrena* in eastern Asia is given.

Key words: taxonomy, Hymenoptera, Andrenidae, *Andrena*, *Cnemidandrena*, revision, new species, eastern Asia.

Introduction

The Holarctic subgenus *Cnemidandrena* Hedicke is represented by 11 species (Hirashima, 1963; Warncke, 1968; Osytshnjuk, 1977, 1995; Dylewska, 1987; Gusenleitner & Schwarz, 2001) in the Palaearctic Region. Warncke (1968) included five European species, and Osytshnjuk (1977) also treated the species of European Russia. Dylewska (1987) treated the Middle and North European species and named *A. nigriceps* group.

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 - 3) Results from the China-Japan Co-operative Study on "Studies on Systematics, Evolution and Biogeography of Asian *Andrena* (Hym., Apoidea, Andrenidae)" No. 12.
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In eastern Asia Yasumatsu (1935) described one species under *Chlorandrena* from China, and Alfken (1936) recorded two species from China and Mongolia. Hirashima (1964, 1966) described three Japanese species and Wu (1982) recorded three species from Tibet, China. Kim (1970) treated one Korean species and Osytshnjuk (1995) reported the Russian Far East species.

In this paper, we give a revision of East Asian species of this subgenus, and recognize 14 species, two of them are divided to two subspecies respectively, including six new species from China and Japan. The holotypes described from China will be preserved in the Institute of Zoology, Academia Sinica, Beijing and the one from Japan in the Entomological Laboratory, Kyushu University, Fukuoka. Paratypes will be deposited in the above Institute and Laboratory.

Subgenus *Cnemidandrena* Hedicke

Cnemidandrena Hedicke, 1933, Mitt. Zool. Mus. Berlin, 19: 212; Lanham, 1949, Univ. California Pub. Ent., 8: 210-211; LaBerge, 1964, Bull. Univ. Nebraska St. Mus., 4: 303-304; Warncke, 1968, Mem. Est. Mus. Zool. Univ. Coimbra, (307): 95-97; Donovan, 1977, Univ. California Pub. Ent., 81: 8-9. Type species. *Melitta nigriceps* Kirby, 1802, by original designation.

Diagnosis: Medium-sized to large bees; facial quadrangle as broad as long or broader; facial fovea broad; clypeus black; subgenal coronet present; malar space short; pronotum with well-developed humeral angle and ridge; propodeal corbicula well developed with complete anterior fringes, internal without hairs; middle basitarsi broadened medially, as broad as or broader than hind basitarsi; tibiae cuneate, with scopal hairs short to rather short, compact, simple; metasomal terga impunctate to weakly punctate. Males with process of labrum strongly reflexed, excavate beneath; mandible without basal tooth; genal area angulate or carinate posteriorly; sterna with short, complete subapical fimbriae.

Key to species of the subgenus *Cnemidandrena* in eastern Asia

Female

1. Clypeus, supraclypeal area and scutellum reddish yellow.....*rufoclypeata* Alfken
- Clypeus, supraclypeal area and scutellum black 2
2. Metasomal terga narrowly to broadly reddened; mid and hind tarsi reddened
..... 3
- Metasomal terga black; legs brown to black 5
3. Mesoscutum densely tessellate; clypeus weakly tessellate with narrow, impunctate

- tessellated line; facial fovea yellowish brown above; caudal fimbria black
 *gobi* n. sp.
- Mesoscutum smooth and shiny medially; clypeus smooth and shiny with or without narrow, impunctate space; facial fovea white above; caudal fimbria not black
 4
4. Clypeus strongly convex with distinct punctures; process of labrum strongly emarginate; caudal fimbria foxy red *hedini* n. sp.
- Clypeus weakly convex with weak punctures; process of labrum weakly emarginate; caudal fimbria pale yellow *gusenleitneri* n. sp.
5. Mesoscutum mixed with blackish hairs medially 6
- Mesoscutum without blackish hairs 11
6. Clypeus without median longitudinal impunctate space 7
- Clypeus with median longitudinal impunctate space 9
7. Clypeus strongly convex with narrow apical shiny space; mesoscutum with a little black hairs medially *carinigera* Wu
- Clypeus weakly convex; mesoscutum with much blackish hairs 8
8. Metasomal terga with short dense white hair bands; thorax and metasomal terga 1-2 with less whitish long hairs *denticulata denticulata* (Kirby)
- Metasomal terga with longer dull yellowish hair bands; thorax and metasomal terga 1-2 with more dull yellowish long hairs *denticulata seneciorum* Hirashima
9. Metasomal terga densely granulate; clypeus with broad longitudinal impunctate shiny space *granulitergorum* n. sp.
- Metasomal terga weakly to densely tessellate; clypeus with narrow longitudinal impunctate space or with broad tessellated impunctate median space 10
10. Flagellar segments reddish yellow beneath; clypeus with closer, distinct punctures
 *maetai* Hirashima
- Flagellar segments reddish brown beneath; clypeus with sparse, weak punctures
 *gigantimurus* n. sp.
11. Thorax and metasomal terga with coarse hairs 12
- Thorax and metasomal terga with fine hairs 14
12. Clypeus with broad longitudinal shiny impunctate space; metasomal terga 2-4 with loose, long, pale yellow hair bands *solidago* n. sp.
- Clypeus without longitudinal impunctate space; metasomal terga 2-4 with compact, dense, short, pale yellow hair bands 13
13. Process of labrum strongly emarginate; metasomal terga 3-4 with short dull white hairs; larger *kishidai kishidai* Yasumatsu
- Process of labrum weakly emarginate; metasomal terga 3-4 with short black hairs; smaller *kishidai chagyabensis* Wu

14. Metasomal terga 3-4 with long erect hairs; mesoscutum weakly tessellate; vertex mixed with black hairs; caudal fimbria black *sublistella* Wu
 - Metasomal terga 3-4 with short erect hairs; mesoscutum densely tessellate; vertex with yellow hairs, not mixed with black; caudal fimbria yellow
 *albicaudata* Hirashima

Male

1. Vertex weakly to distinctly angulate laterally 2
 - Vertex round laterally 5
 2. Mesoscutum mixed with blackish hairs; metasomal sterna 2-5 with sparse, subapical fringes 3
 - Mesoscutum without blackish; metasomal sterna 2-5 with long, curled, subapical fringes 4
 3. Mesoscutum with much black hairs; genal area with distinct projections near base of mandibles; mesoscutum smooth and shiny medially
 *denticulata denticulata* (Kirby)
 - Mesoscutum mixed with blackish hairs only medially; genal area with weak projections near mandibles; mesoscutum weakly tessellate medially
 *denticulata seneciorum* Hirashima
 4. Process of labrum strongly emarginate; mesoscutum densely tessellate, with fulvous hairs; metasomal terga 3-5 with pale yellow hairs *albicaudata* Hirashima
 - Process of labrum weakly emarginate; mesoscutum smooth to weakly tessellate, with whitish hairs; metasomal terga 3-5 with short brown hairs
 *maetai* Hirashima
 5. Mesoscutum with black hairs; metasomal terga 3-5 with black hairs; mid and hind tarsi reddish yellow *latigena* Wu
 - Mesoscutum without black hairs 6
 6. Metasomal terga narrowly to broadly reddened 7
 - Metasomal terga brown to black 9
 7. Flagellar segment 1 shorter than FL2; legs brown; metasomal terga densely granulate; clypeus with sparse hairs; metasomal terga 5-6 with pale brown hairs
 *kishidai kishidai* Yasumatsu
 - Flagellar segment 1 longer than FL2; legs yellow to ferruginous; metasomal terga smooth to weakly tessellate; clypeus with dense hairs; metasomal terga 5-6 without brown hairs 8
 8. Thorax and metasomal terga with foxy red hairs; process of labrum weakly protuberant, weakly emarginate apically; metasomal sterna 2-5 with sparser subapical fimbriae *gusenleitneri* n. sp.

- Thorax and metasomal terga with dull whitish hairs; process of labrum strongly protuberant, strongly emarginate apically; metasomal sterna 2-5 with denser subapical fimbriae *hedini* n. sp.
- 9. Clypeus flat medially with distinct impunctate, longitudinal, shiny space *solidago* n. sp.
- Clypeus weakly convex medially without impunctate, longitudinal, shiny space 10
- 10. Process of labrum strongly emarginate apically; mesoscutum densely tessellate *gobi* n. sp.
- Process of labrum weakly emarginate apically; mesoscutum smooth and shiny to weakly tessellate medially *sublisterella* Wu

1. *Andrena* (*Cnemidandrena*) *rufoclypeata* Alfken

(Fig. 1: A-E)

Andrena rufoclypeata Alfken, 1936, Arkiv Zool., 27A, (37): 12 [female, S. Mongolia]; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15: 280 [in list].

Redescription.

Female: BL 10.0 mm, WL 8.5 mm (n=1).

Color: Flagellar segments 2-9 reddish brown beneath, scape to first flagellar segment and tip of flagellar segment 10 reddish yellow; clypeus and supraclypeal area reddish yellow; mandible reddened; wing membranes subhyaline, veins and pterostigma reddish yellow; scutellum, legs and tibial spurs yellow; metasomal terga 1-2 and part of tergum 3 reddish, posterior margins of terga yellowish translucent.

Pubescence: Hairs on head and thorax dense, foxy-red; those on clypeus 200-400 μ , those on vertex about 500 μ ; those on genal area 400-500 μ ; facial fovea yellowish. Hairs on mesoscutum and scutellum 400-600 μ ; those on mesepisternum sparse, yellow; propodeal corbicula completely developed with anterior fringes, internal without hairs; trochanteral floccus perfect, yellow; femoral floccus dense; tibial scopal hairs short, simple, yellow. Hairs on metasomal terga dense, yellow to dark red; those on terga 1-2 moderately long, yellow; those on terga 3-4 short, dark red; terga 2-4 with broad, not compact yellow hair bands; caudal fimbria reddish yellow; sterna 2-5 with incomplete, sparse yellow subapical fimbriae.

Structure: *Head:* HL/HW = 0.80. HW: MsW: MtW = 3.2: 3.2: 3.2. Vertex finely tessellate with minute PP, IS = 1. OOD: POD: OCD = 0.6: 0.4: 0.2. FL1 slightly shorter than FL2+3, FL2 = FL3 about as long as broad, intermediate segments as long as broad. Eyes with inner margins paralleled. Facial fovea extending to below a line at lower margin

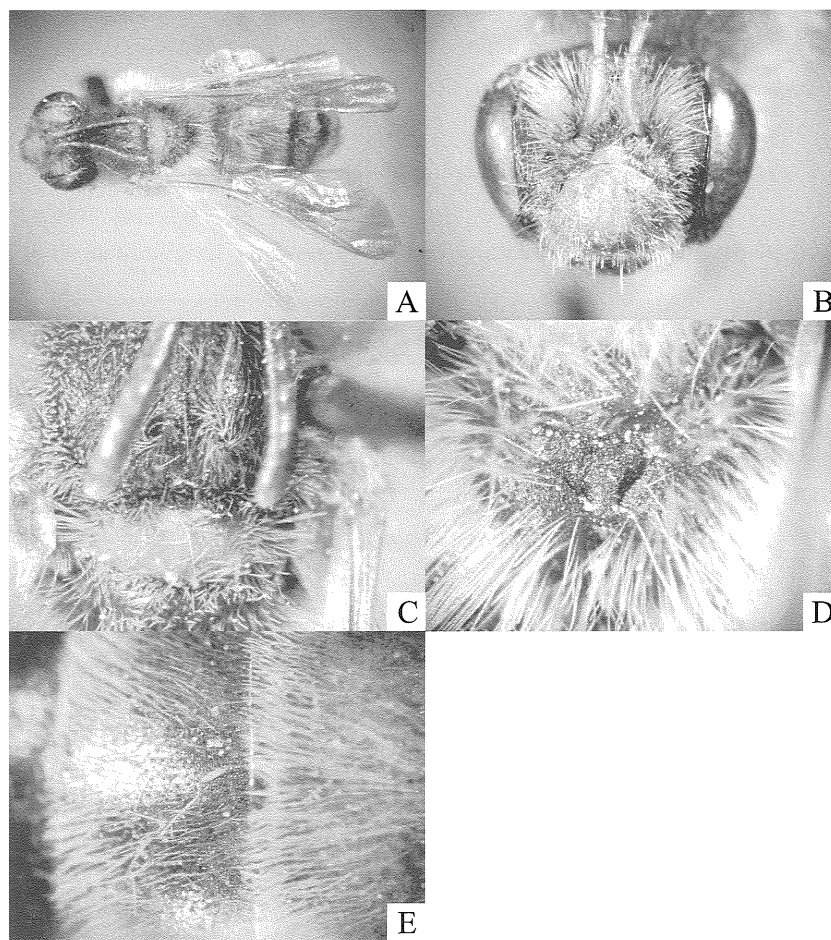


Fig. 1: A - E. *Andrena (Cnemidandrena) rufoclypeata* Alfken, female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

of antennal fossae, FVL = 1.2 mm, FVW = 0.5 mm. Supraclypeal area shagreened by minute PP. Face above antennal fossae with fine longitudinal rugulae and weak interrugal PP, shagreening surface. Facial quadrangle as long as broad (about 2.2: 2.2). Clypeus strongly convex medially, surface weakly tessellate with dense PP $\phi 20\mu$, IS = 0.5, sparser toward apical margin, median with indistinct impunctate line, apical margin weakly upturned, CPL = 1.1 mm. Process of labrum broad, trapezoidal, emarginate apically, surface smooth and shiny. Labrum apical to process flat, median with weak crista. Lower paraocular area smooth and shiny with PP $\phi 10-20\mu$, IS = 0.5-1. Malar space rather short, about one sixth as long as width of basal mandible. Genal area broader than eye, GW: EW = 0.9: 0.8, surface broadly densely tessellate posteriorly, narrowly smooth and shiny with microscopic PP near eye. *Mesosoma*: Pronotum weakly reticularly shagreened, feebly shiny. Mesoscutum weakly tessellate with weak minute PP, IS = 1, densely tessellate peripherally.

Scutellum smooth and shiny, PP obscured. Propodeal enclosure finely tessellate at apical 3/4, weakly rugulose at basal 1/4; dorsal face of propodeum densely tessellate with sparse minute PP. Mesepisternum densely tessellate with weak minute PP. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. Middle basitarsus broader than hind one. *Metasoma*: Metasomal terga weakly tessellate, shiny, nearly impunctate; posterior depressions of terga not well indicated; pygidial plate V-shaped, internal with broad raised triangular area. Sterna 2-5 weakly tessellate, shiny with fine PP, IS = 1.

Male: Unknown.

Specimens examined: Holotype female, S. Mongoliet, 1927. Sven Hedin's Exp. Ctr. Asien, Dr Hummel (Naturhistoriska Riksmuseet, Stockholm, Sweden). Other material: CHINA: Qinghai Province: 1 female, Cahanwusu, 9. viii. 1950 (J-k. Yang).

Remarks: This species is somewhat similar to *Andrena fuscipes* (Kirby) in having foxy-red hairs on the thorax, but is easily recognized by the clypeus, supraclypeal area and the scutellum reddish yellow, and the metasomal terga reddened in part.

Distribution: China (new record: Qinghai Prov.); Mongolia.

Floral association: Not available.

Flight records: Female: early August.

2. *Andrena (Cnemidandrena) gobi* n. sp.

(Figs. 2: A-E, 3: A-E, 4: A-E)

Female: BL 11.5-12.0 mm, WL 9.6-9.8 mm (n=2).

Color: Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes infumate, veins and pterostigma brown; tibial spurs testaceous; posterior depressions of metasomal terga brownish transparent.

Pubescence: Hairs on head sparse, dull white, those on antennal area and vertex mixed with a little brown ones; those on clypeus dense, downy, moderately long (400-600 μ); those on antennal area whitish; those on vertex 600-800 μ , bright yellow; those on genal area sparse, pale yellow; facial fovea bright brown above, yellow below. Hairs on thorax dense; those on mesoscutum and scutellum 600-1000 μ , fulvous; those on mesepisternum pale yellow; propodeal corbicula completely developed, fulvous, internal with sparse simple hairs anteriorly; trochanteral floccus imperfect, silver white; femoral floccus dense; tibial scopal hairs short, simple, pale brown. Hairs on metasomal terga moderately dense, erect; those on terga 1-3 long, yellowish; those on tergum 4 short, blackish; terga 2-4 with long, pale yellowish hair bands; caudal fimbria black; sterna 2-4 with long, white subapical fimbriae, sternum 5 with pale brown hairs.

Structure: Head: HL/HW = 1.08. HW: MsW: MtW = 3.3: 3.3: 3.7. Vertex convex,

roughened with close PP \varnothing 20 μ . OOD: POD: OCD = 0.85: 0.68: 0.5. FL1 < FL2+3, FL2 = FL3, which is longer than broad, intermediate segments longer than broad. Eyes with inner margins subparallel. Facial fovea broad, extending to below a line at lower margin of antennal fossae, FVL = 0.9 mm, FVW = 0.4 mm. Supraclypeal area densely punctate with minute PP. Face above antennal fossae with dense longitudinal rugulae and weak interrugal PP, shagreening surface. Facial quadrangle slightly broader than long (about 2.3: 2.4). Clypeus well convex medially, weakly tessellate, surface with PP \varnothing 20-30 μ , IS = 0.5-1, median with narrow longitudinal impunctate space, CPL = 1.2 mm. Process of labrum trapezoidal, weakly emarginate apically. Labrum apical to process with distinct cristae. Lower paraocular area smooth and shiny with close small PP. Malar space nearly linear. Genal area broader than eye, GW: EW = 1.0: 0.8, surface weakly tessellate posteriorly with weak minute PP \varnothing 20 μ , IS = 1-2, broadly shiny with close minute PP near eye.

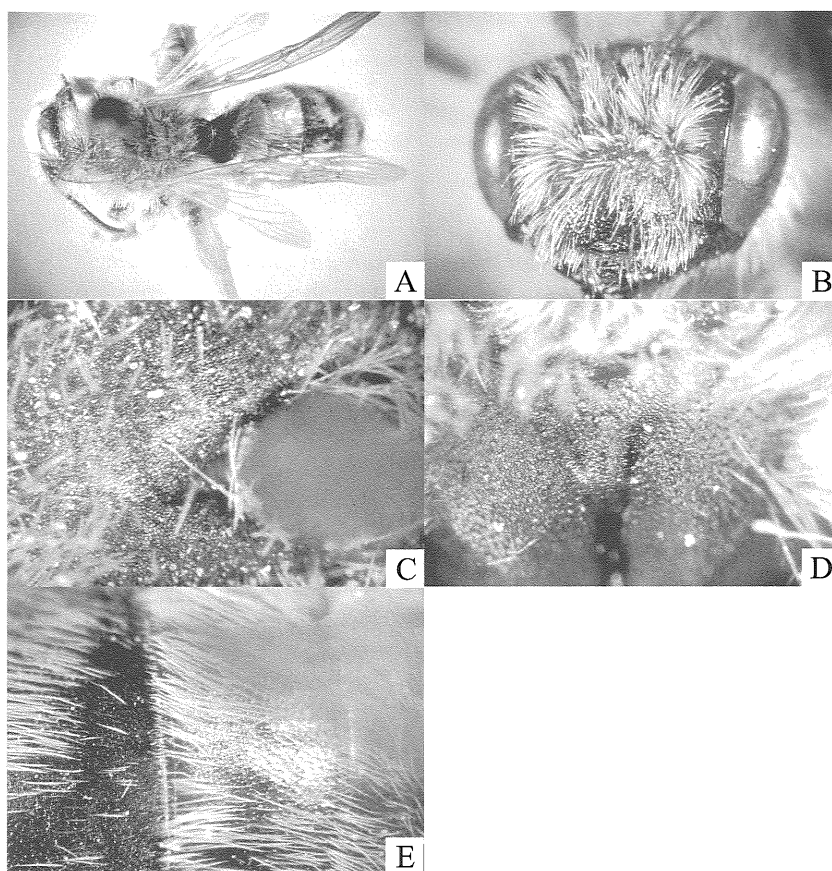


Fig. 2: A - E. *Andrena (Cnemidandrena) gobi* n. sp., female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

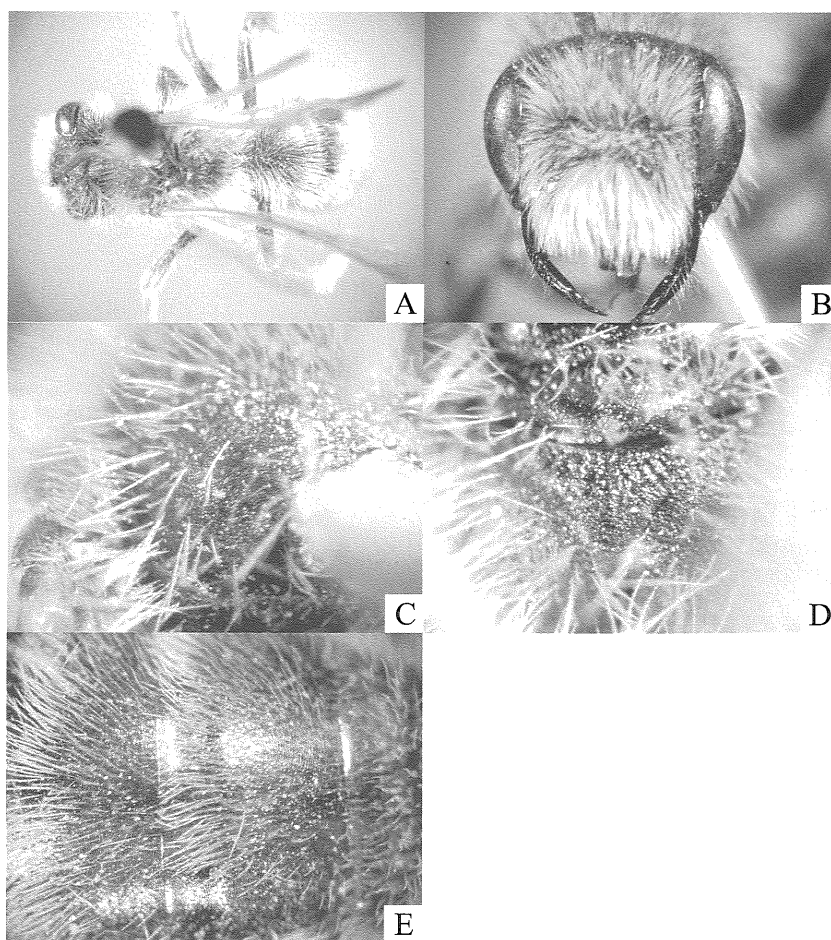


Fig. 3: A - E. *Andrena (Cnemidandrena) gobi* n. sp., male. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

Mesosoma: Pronotum with dorsal surface weakly tessellate with weak minute PP ϕ 20 μ , IS = 1-2. Mesoscutum densely tessellate and weakly punctate medially with shallow PP ϕ 20-30 μ , IS = 1-2. Scutellum weakly tessellate, scattered with small PP. Propodeal enclosure densely tessellate at apical 1/3, rugose at basal 2/3; dorsal face of propodeum densely tessellate with roughened PP. Mesepisternum densely tessellate with weak PP ϕ 20 μ , IS = 1-2. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga densely tessellate; terga 1-4 with indistinct PP ϕ 20 μ , IS = 1-2, apical areas tessellate; posterior depressions of terga well indicated; pygidial plate V-shaped with large raised triangular area. Sterna 2-5 densely tessellate with fine PP ϕ 20 μ , IS = 1-3.

Male: BL 10.6 mm, WL 8.6 mm (n=1).

Color: Flagellum reddish brown beneath; mandible with apical fourth reddened; wing membrane infumate, veins and pterostigma yellowish brown; tibial spurs testaceous; hind

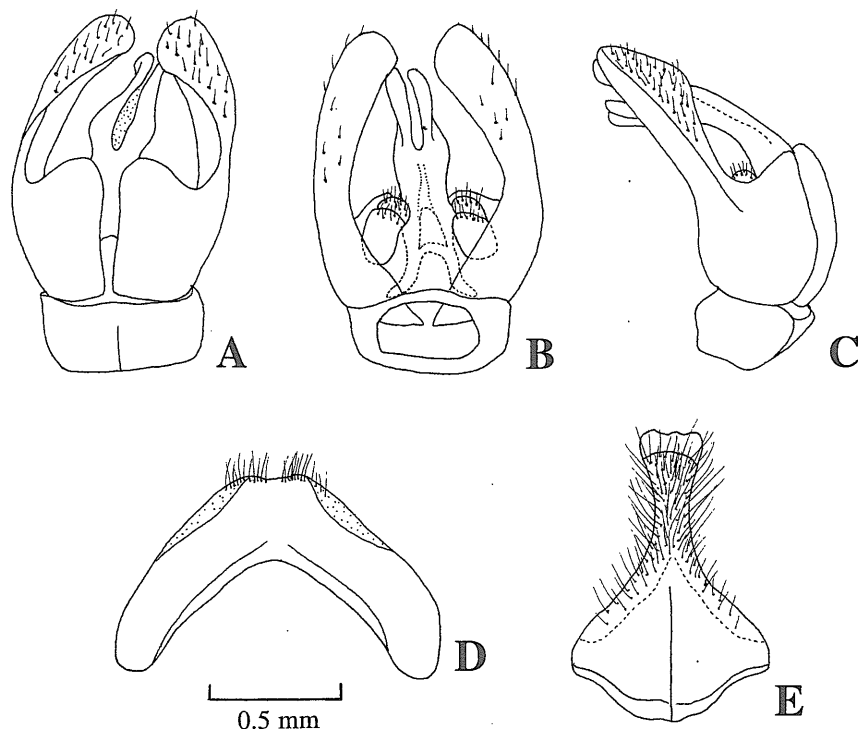


Fig. 4: A - E. *Andrena (Cnemidandrena) gobi* n. sp., male. Genital capsule and subgenital sterna.

A: dorsal view of genital capsule; B: ventral view of the same; C: lateral view of the same; D: metasomal sternum 7; E: metasomal sternum 8.

tarsi yellowish; posterior margins of metasomal terga brownish subhyaline.

Pubescence: Hairs on head $600-800\mu$, dense, white; those on antennal area mixed with brown, those on vertex yellow mixed with brown. Hairs on thorax as in female. Hairs on metasomal terga moderately dense, pale yellow, those on terga 1-3 long; those on terga 4-5 pale brown; terga 2-4 with suberect loose, pale yellow hair bands; sterna 2-5 with dense, white hair bands.

Structure: *Head:* $HL/HW = 0.96$. $HW: MsW: MtW = 3.0: 2.7: 3.0$. Vertex not angulate laterally in frontal view, densely tessellate, dulled with close PP above lateral ocelli, weakly tessellate and shiny near top of eye, with fine $PP \approx 20\mu$, $IS = 1$. $OOD: POD: OCD = 0.9: 0.7: 0.5$. $FL1 > FL2$, $FL2$ subequal to $FL3$, $FL2$ slightly longer than broad. Eyes with inner margins subparallel. Supraclypeal area smooth and shiny, deeply punctate. Face

above antennal fossae as in female. Facial quadrangle as broad as long (about 2.0: 2.1). Clypeus weakly convex medially, surface smooth and shiny with close $PP\varnothing 20\mu$, $IS = 0.5-1$, $CPL = 0.8$ mm. Process of labrum protuberant, deeply emarginate apically. Labrum apical to process with crista. Mandibles falciform, decussate. Lower paraocular area smooth and shiny with distinct $PP\varnothing 20\mu$, $IS = 0.5-1$. Malar space linear. Genal area without projections near base of mandibles, weakly angulate posteromedially, $GW: EW = 1.3: 0.8$, surface weakly tessellate posteriorly, broadly smooth and shiny with minute $PP\varnothing 10\mu$, $IS = 1-2$ near eye. *Mesosoma*: Pronotum with dorsal face finely tessellate with irregular small PP. Mesoscutum and scutellum sculptured as in female. Propodeal enclosure densely tessellate at apical 1/2, rugose at basal 1/2; dorsal face of propodeum and mesepisternum densely tessellate with sparse minute PP. Wing venation as in female. *Metasoma*: Metasomal tergum 1 finely tessellate with sparse PP; terga 2-5 weakly tessellate, feebly shiny, surface with shallow minute $PP\varnothing 20\mu$, $IS = 2-3$; posterior depressions of terga weakly indicated. Sterna 2-5 sculptured as in terga; sternum 6 weakly reflected.

Type material: Female, Tumuertai, Wumeng, Inner Mongol Auton. Region, China, 29. viii. 1971. Paratypes: CHINA: same locality as the holotype, 1 female, 30. viii. 1971; 1 male, 15. viii. 1971.

Remarks: This species is similar to *Andrena hedini* n. sp. and *Andrena albicaudata* Hirashima in having the thorax with fulvous hairs. But it is recognized by the facial fovea brown above, the clypeus with narrow longitudinal impunctate line, the vertex mixed with brownish hairs and the caudal fimbria black.

Distribution: China (Inner Mongol Auton. Region).

Floral association: Not available.

Flight records: Female: late August; male: mid August.

Etymology: The specific name is derived from Gobi Desert in Inner Mongol Autonomous Region, China and Mongolia.

3. *Andrena (Cnemidandrena) hedini* n. sp.

(Figs. 5: A-E, 6: A-E, 7: A-E)

Female: BL 12.0-13.2 mm, WL = 10.0-10.7 mm (n=5).

Color: Flagellum reddish yellow beneath; mandible with apical half or less reddened; wing membranes subhyaline, veins and pterostigma reddish brown; tibiae and basitarsi reddish yellow, tibial spurs yellow; metasomal terga 1-3 reddish in part, posterior margins of metasomal terga yellowish transparent.

Pubescence: Hairs on head abundant, yellow to golden; those on clypeus $350-500\mu$, those on vertex $500-750\mu$, golden; those on genal area yellow; facial fovea pale yellow. Hairs on mesoscutum 700μ anteriorly, $300-400\mu$ posteriorly, dense, foxy red to yellow;

those on scutellum and metanotum longer; those on mesepisternum longest, yellowish; propodeal corbicula completely developed, internal without hairs; trochanteral floccus imperfect, short at basal half; femoral floccus dense; tibial scopal hairs short, simple, golden, basitarsi with golden hairs. Hairs on metasomal terga dense, yellow to reddish yellow; those on terga 1-2 moderately long, suberect; those on terga 3-4 short; terga 2-4 with broad, subappressed, yellow hair bands; caudal fimbria golden; sterna 2-5 with incomplete yellow subapical fimbriae.

Structure: Head: HL/HW = 0.78. HW: MsW: MtW = 3.5: 3.7: 4.0. Vertex finely tessellate with close shallow minute PP, not roughened. OOD: POD: OCD = 0.7: 0.5: 0.25. FL1 = FL2+3, FL2 = FL3, which is longer than broad, intermediate segments longer than broad. Eyes with inner margins subparallel. Facial fovea extending to below a line at lower margin of antennal fossae, FVL = 1.4 mm, FVW = 0.5 mm. Supraclypeal area

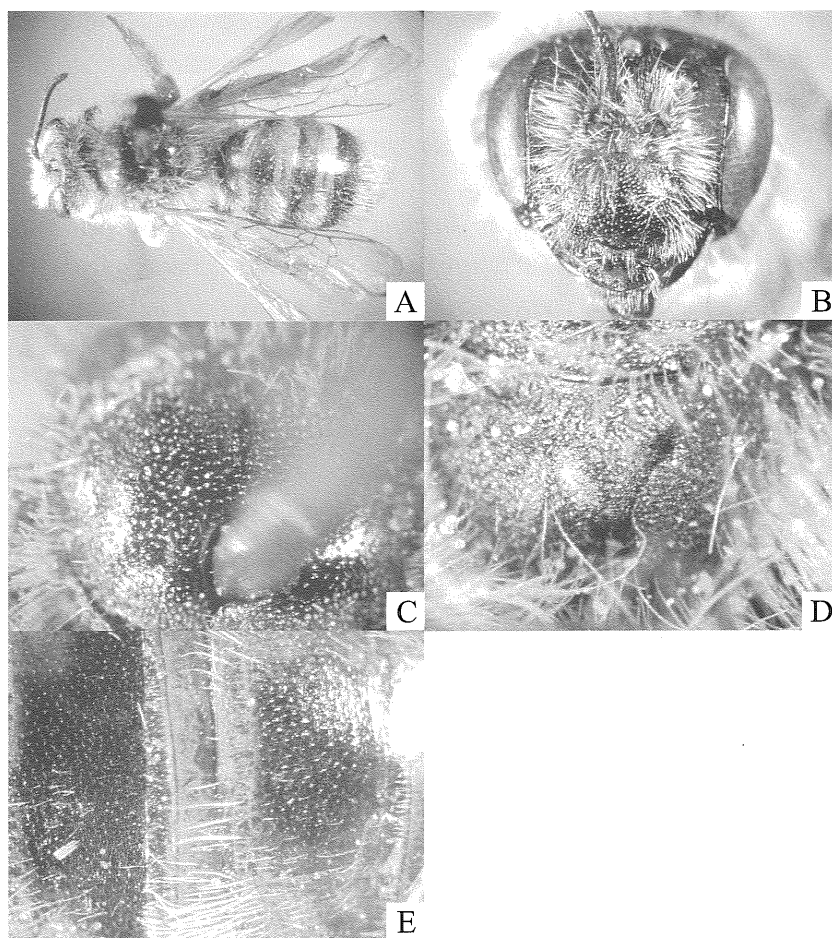


Fig. 5: A - E. *Andrena (Cnemidandrena) hedini* n. sp., female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

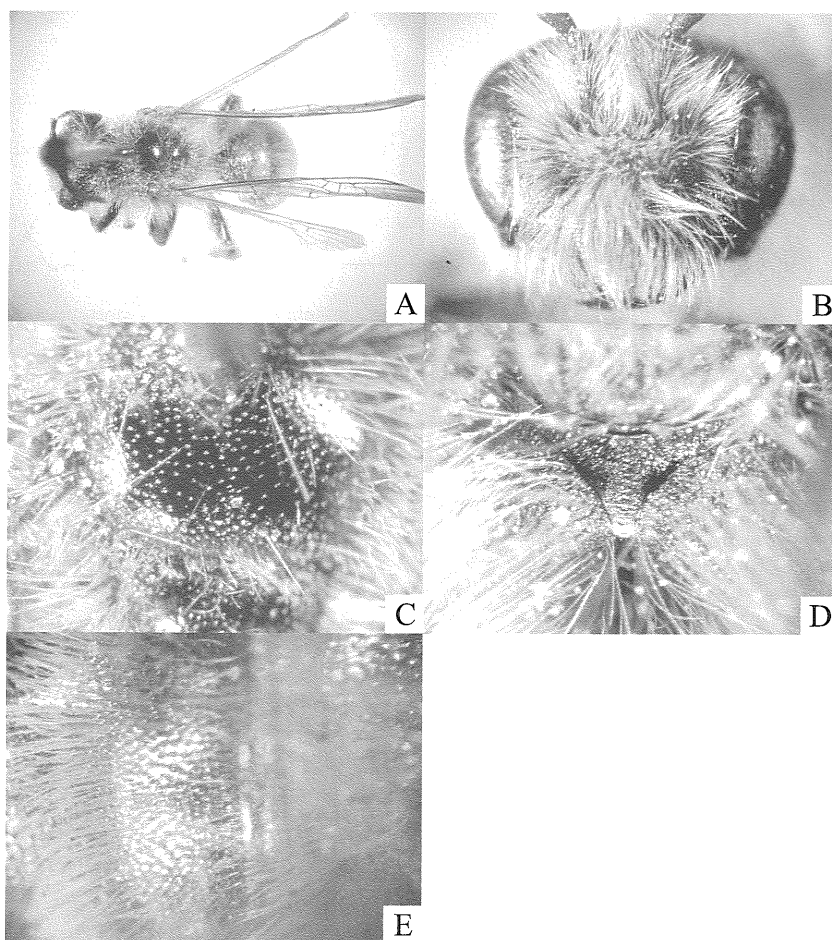


Fig. 6: A - E. *Andrena (Cnemidandrena) hedini* n. sp., male. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

densely punctate, tessellate. Face above antennal fossae with fine longitudinal rugulae, interrugal PP obscure. Facial quadrangle as broad as long (about 2.4: 2.4). Clypeus slightly convex, smooth to weakly tessellate and shiny with crowded $PP \approx 20\mu$, $IS < 0.5$, rather sparser toward apical margin, median without longitudinal impunctate line, $CPL = 1.2$ mm. Process of labrum large, truncate from middle to apex, deeply emarginate apically, surface with longitudinal median ridge. Labrum apical to process with median cristae. Lower paraocular area smooth and shiny with PP irregular in size and distribution. Malar space nearly linear. Genal area broader than eye, $GW: EW = 0.9: 0.8$, surface densely tessellate posteriorly with weak minute PP, $IS = 2$, smooth and shiny with linear minute PP near eye. *Mesosoma*: Pronotum with distinct humeral angle and ridge, surface finely tessellate. Mesoscutum densely tessellate peripherally, weakly tessellate medially, surface feebly shiny with minute PP, $IS = 1$ or more. Scutellum smooth and shiny, with small PP

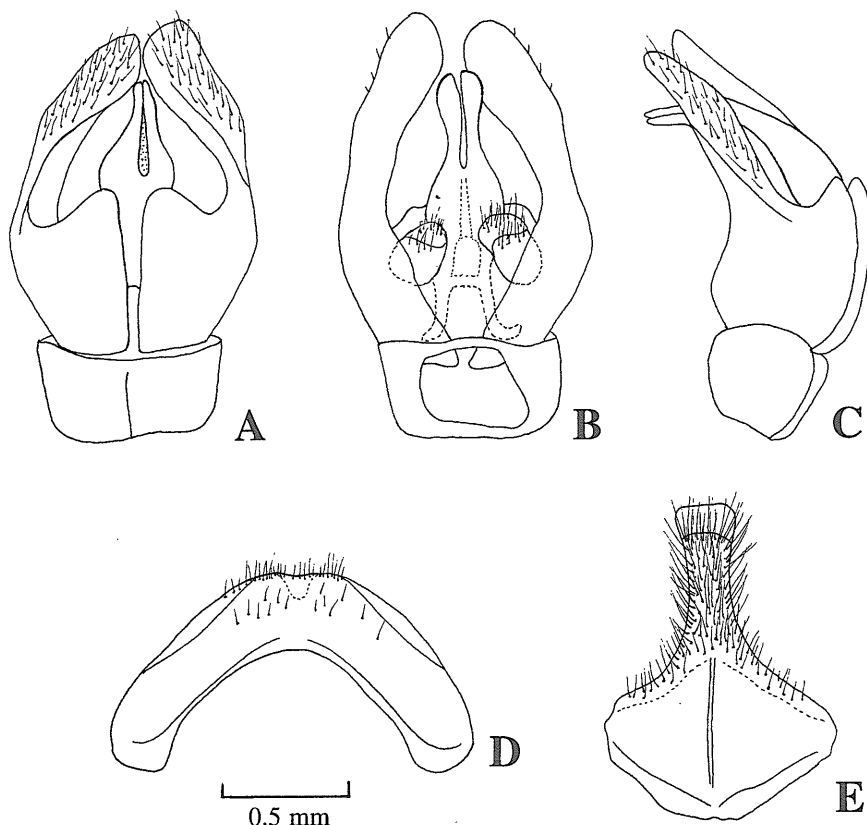


Fig. 7: A - E. *Andrena* (*Cnemidandrena*) *hedini* n. sp., male. Genital capsule and subgenital sterna.

A: dorsal view of genital capsule; B: ventral view of the same; C: lateral view of the same;
D: metasomal sternum 7; E: metasomal sternum 8.

irregular in distribution, Propodeal enclosure well defined, densely tessellate with fine irregular rugulae at basal 1/2 to 2/3, median with a longitudinal depression, crossed by transverse rugulae in some specimens; dorsal face of propodeum shagreened with obscure minute PP. Mesepisternum densely tessellate and a little roughened with sparse minute PP. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga weakly tessellate, weakly shiny; tergum 1 with minute PP, IS = 1-2 at apical area; terga 2-4 with microscopic PP, IS = 1 near middle areas; posterior depressions of terga broad, not well indicated; pygidial plate V-shaped with rounded apex, internal with distinct raised triangular area. Sterna 2-5 weakly tessellate, narrowly impunctate basally, finely tessellate with minute PP, IS = 1-2 apically.

Male: BL 10.0 mm, WL 8.5 mm (n=1).

Color: Flagellum yellowish brown beneath; mandible with apical third reddened; wing

membrane subhyaline, cloud apically, veins and pterostigma reddish brown; hind tibiae and basitarsi reddish yellow, tibial spurs yellow; terga 1-4 reddish in part; posterior margins of terga yellowish, transparent.

Pubescence: Hairs on head abundant, white to whitish; those on clypeus and genal area $500-750\mu$; those on antennal area whitish; those on vertex $500-750\mu$, whitish. Hairs on mesoscutum not dense, whitish; those on scutellum and propodeum dense, whitish; those on mesepisternum longer, whitish to white. Hairs on metasomal tergum 1 moderately long, whitish; those on terga 2-5 short, erect, yellowish white; terga 2-5 with dense, suberect yellowish white hair bands; sterna 2-5 with well-formed dense subapical fimbriae.

Structure: Head: $HL/HW = 0.82$. $HW: MsW: MtW = 3.3: 3.0: 3.0$. Vertex not angulate laterally in frontal view, a little roughened with close PP at middle, smooth and shiny near top of eyes. $OOD: POD: OCD = 0.7: 0.45: 0.3$. $FL1$ about as long as $FL3$, which is longer than $FL2$, $FL2$ as long as broad. Eyes with inner margins subparalleled. Supraclypeal area and face above antennal fossae sculptured similar to female, but interrugal PP stronger. Facial quadrangle as long as broad (about $2.2: 2.2$). Clypeus nearly flattened, smooth and shiny with close $PP \approx 20\mu$, $IS < 0.5$, $CPL = 1.1$ mm. Process of labrum protuberant, deeply excavate beneath. Labrum apical to process with distinct crista. Mandibles decussate, but not falciform. Lower paraocular area as in clypeus. Malar space linear. Genal area without short projections near mandibles; broadened, weakly angulate posteromedially, $GW: EW = 1.0: 0.85$, surface finely tessellate posteriorly, broadly smooth and shiny with minute PP, $IS = 1$ near eye. *Mesosoma*: Pronotum with distinct humeral angle and ridge, dorsal surface densely tessellate with obscure PP. Mesoscutum smooth and shiny with small, sparse PP, $IS = 1-2$ medially, densely tessellate and denser PP peripherally. Scutellum smooth and shiny with shallow, sparse PP. Propodeum including enclosure, mesepisternum sculptured as in female. Wing venation as in female. *Metasoma*: Metasomal terga smooth and shiny; terga 1-2 with shallow, sparse small PP, $IS = 1-2$; terga 3-5 with same small PP, closer; posterior depressions of terga not well indicated. Sterna 2-5 as in terga 2-5, but PP sparser; sternum 6 weakly reflected, not emarginate apically.

Type material: Holotype female, Tashikuergan, 3,700 m, Xinjiang Uygur Auton. Region, China, 16. viii. 1974 (J-p. Liu). Paratypes: CHINA: Xinjiang Uygur Auton. Region: 3 females, same data as the holotype; 1 female and 1 male, Kalaqigu, 3,550 m, Tashikuergan, 11. viii. 1981 (X-z. Zhang).

Remarks: This species is similar to *Andrena albicaudata* Hirashima and *A. gobi* n. sp. in having the mesoscutum with fulvous hairs. But it is recognized by the mesoscutum smooth and shiny medially, the process of labrum strongly emarginate, the facial fovea white above, the clypeus smooth and shiny, the female caudal fimbria golden, the male legs ferruginous, and the male mandible not falciform.

Distribution: China (Xinjiang Uygur Auton. Region).

Floral association: Not available.

Flight records: Female: mid August; male: mid August.

Etymology: The specific name is dedicated to Swedish explorer, Sven Hedin who produced brilliant achievements in exploration in Xinjiang Uygur, China and Central Asia.

4. *Andrena (Cnemidandrena) gusenleitneri* n. sp.

(Figs. 8: A-E, 9: A-E, 10: A-E)

Female: BL 9.5-10.6 mm, WL 8.0-8.5 mm (n=9).

Color: Flagellum reddish yellow beneath; mandible with apical half reddened; wing membranes infumate, veins and pterostigma yellowish brown; tibial spurs yellow; posterior depressions of metasomal terga yellowish transparent.

Pubescence: Hairs on head moderately dense, dull white; those on clypeus moderately long (500-700 μ) at extreme angle; those on antennal area and vertex not mixed with brownish, 500-800 μ , pale yellow; those on genal area dense, pale yellow; facial fovea white. Hairs on thorax not dense, short; those on mesoscutum and scutellum 500-750 μ , pale yellow; those on mesepisternum pale yellow to whitish; propodeal corbicula completely developed, pale yellow, internal with sparse simple hairs anteriorly; trochanteral floccus imperfect, white; femoral floccus dense; tibial scopal hairs short, simple, pale yellowish. Hairs on metasomal terga sparse, erect; those on terga 1-2 long, yellow; those on terga 3-4 short, yellow; terga 2-4 with long, loose, yellow hair bands; caudal fimbria yellow; sterna 2-4 with long, white subapical fimbriae.

Structure: Head: HL/HW = 1.10. HW: MsW: MtW = 3.7: 3.6: 4.1. Vertex dulled with roughened PP ϕ 20, IS > 1. OOD: POD: OCD = 0.63: 0.58: 0.33. FL1 < FL2+3, FL2 = FL3, which is as long as broad, intermediate segments as long as broad. Eyes with inner margins subparalleled. Facial fovea not broad, extending to below a line at lower margin of antennal fossae, FVL = 0.8 mm, FVW = 0.3 mm. Supraclypeal area a little roughened with weak PP. Facial quadrangle as broad as long (about 2.6: 2.6). Clypeus weakly convex, nearly flat medially, smooth to weakly tessellate, surface with sparse PP ϕ 20 μ , IS = 1-2, median without longitudinal impunctate space, but with broad impunctate space medioapically, CPL = 0.9 mm. Process of labrum trapezoidal, convex apically, weakly emarginate apically. Lower paraocular area smooth and shiny with close small PP. Malar space linear. Genal area as broad as eye, GW: EW = 1.0: 1.0, surface weakly tessellate posteriorly broadly shiny with close minute PP near eye. *Mesosoma:* Pronotum with dorsal surface weakly tessellate with weak minute PP ϕ 20 μ , IS = 1. Mesoscutum smooth to weakly tessellate, weakly punctate medially with fine PP ϕ 20 μ , IS = 1.5-2. Scutellum smooth and shiny, scattered with small PP. Propodeal enclosure densely tessellate at apical 2/3, weakly rugulose at

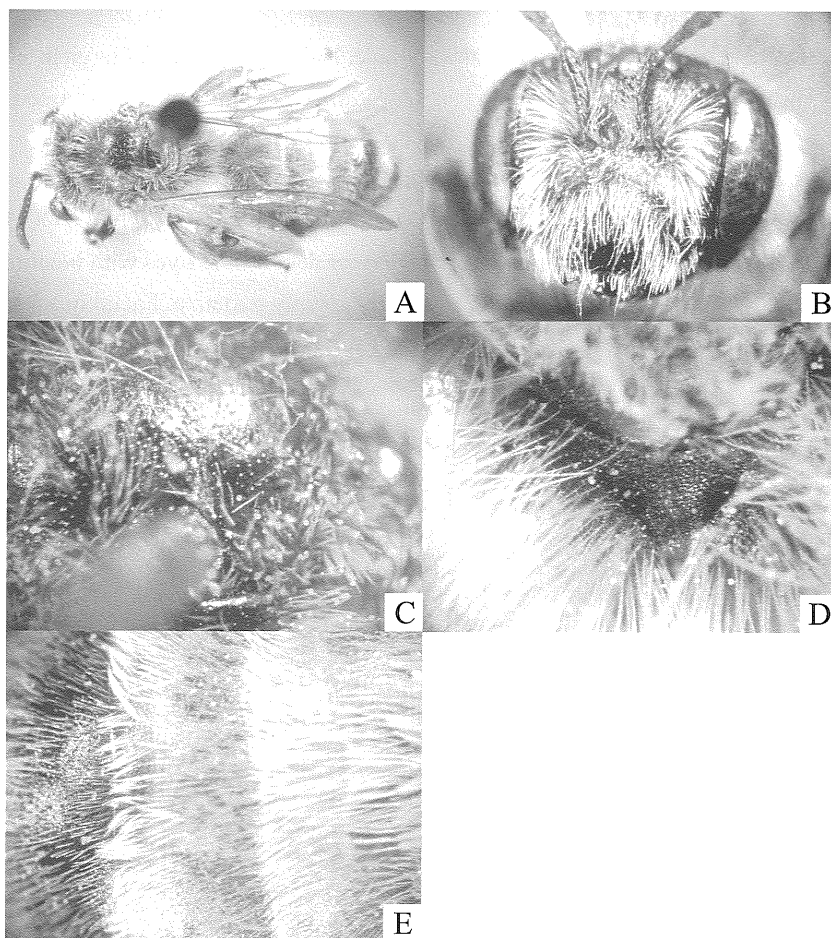


Fig. 8: A - E. *Andrena (Cnemidandrena) gusenleitneri* n. sp., female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

basal 1/3; dorsal face of propodeum densely tessellate, weakly roughened, obscurely punctate. Mesepisternum weakly tessellate with weak, obscure PP ϕ 20 μ , IS = 1-2. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga densely tessellate; terga 1-4 with microscopic PP ϕ 20-30 μ , IS = 1-2, posterior depressions of terga well indicated; pygidial plate V-shaped with large raised triangular area. Sterna 2-5 weakly tessellate with fine PP ϕ 20 μ , IS = 1-2.

Male: BL 9.3-9.6 mm, WL 8.2-8.5 mm (n=6).

Color: Flagellum reddish yellow beneath; mandible with apical third reddened; wing membrane infumate, veins and pterostigma brownish; mid and hind tibiae and tarsi reddish yellow; tibial spurs yellow; metasomal terga 1-4 broadly ferruginous; posterior margins of metasomal terga yellow subhyaline.

Pubescence: Hairs on head 400-700 μ , dense, fulvous; those on antennal area and vertex

not mixed with brown. Hairs on thorax as in female. Hairs on metasomal terga moderately dense, shorter than in female, those on terga 1-5; terga 2-4 with suberect sparse fulvous hair bands; sterna 2-5 with sparse, erect, fulvous hairs.

Structure: Head: HL/HW = 1.08. HW: MsW: MtW = 3.0: 2.6: 2.6. Vertex not angulate laterally in frontal view, tessellate with roughened PP ϕ 30 μ , IS > 1. OOD: POD: OCD = 0.8: 0.6: 0.4. FL1= FL2, FL2 shorter than FL3, FL2 longer than broad. Eyes with inner margins subparallel. Supraclypeal area smooth and shiny, deeply punctate. Facial quadrangle as broad as long (about 2.2: 2.2). Clypeus weakly convex medially, surface smooth and feebly shiny with close PP ϕ 20 μ , IS = 1, CPL = 0.9 mm. Process of labrum emarginate apically. Mandibles decussate, but not falciform. Lower paraocular area smooth and shiny with small PP ϕ 20 μ , IS = 0.5-1. Malar space linear. Genal area without projections near base of mandibles, weakly angulate posteromedially, GW: EW = 1.2: 0.8, surface weakly tessellate

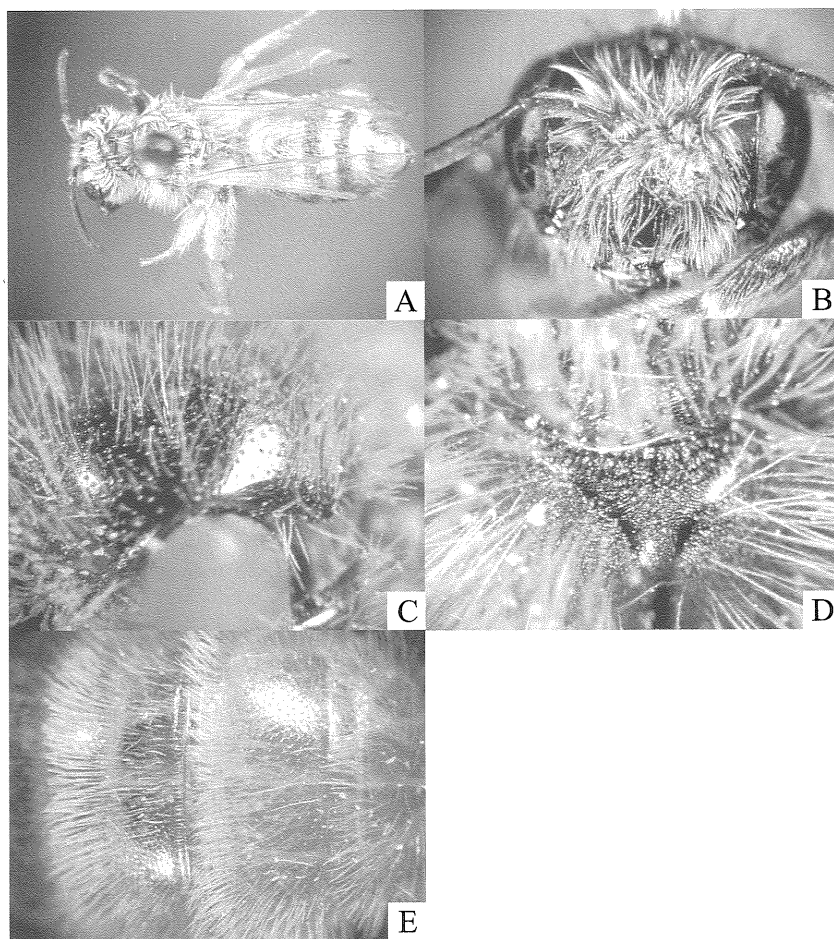


Fig. 9: A - E. *Andrena (Cnemidandrena) gusenleitneri* n. sp., male. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

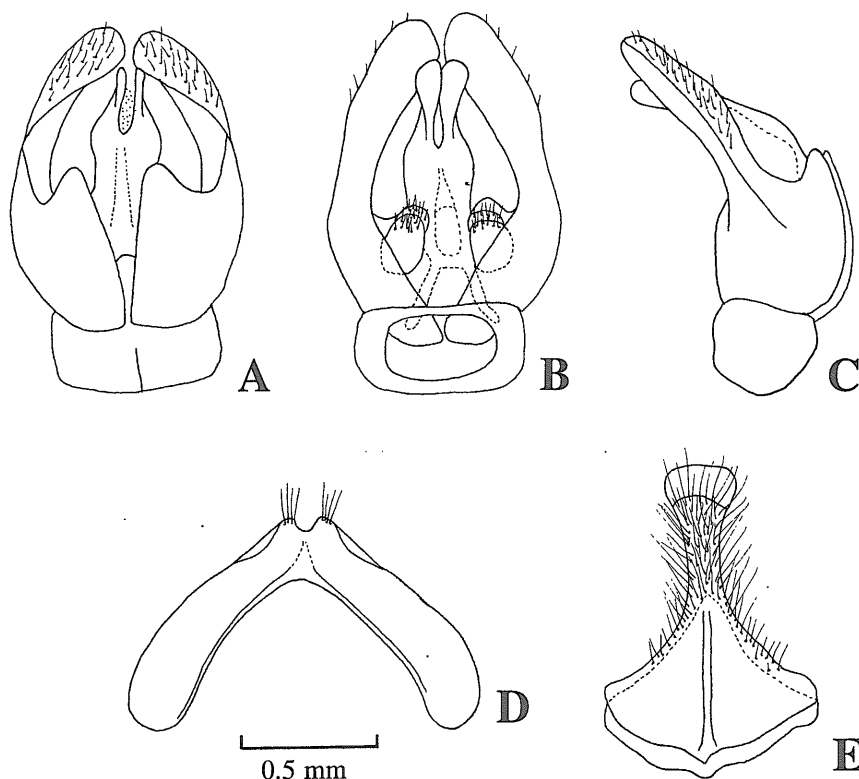


Fig. 10: A - E. *Andrena* (*Cnemidandrena*) *gusenleitneri* n. sp., male. Genital capsule and subgenital sterna. A: dorsal view of genital capsule; B: ventral view of the same; C: lateral view of the same; D: metasomal sternum 7; E: metasomal sternum 8.

posteriorly, broadly smooth and shiny with minute PP $\varnothing 10\mu$, IS = 1-2 near eye. *Mesosoma*: Pronotum with dorsal face tessellate with small PP. Mesoscutum and scutellum weakly tessellate with shallow PP medially. Propodeal enclosure densely tessellate at apical 2/3, weakly rugose with short, slanting rugulae at basal 1/3; dorsal face of propodeum and mesepisternum densely tessellate with sparse minute PP. Wing venation as in female. *Metasoma*: Metasomal tergum 1 smooth and shiny with minute PP; terga 2-5 weakly tessellate, surface with shallow minute PP $\varnothing 20\mu$, IS = 1; posterior depressions of terga well indicated. Sterna 2-5 sculptured as in terga; sternum 6 weakly reflected.

Type material: Female, Tumuertai, Wumeng, Inner Mongol Auton. Region, China, 31. viii. 1971. Paratypes: CHINA: Inner Mongol Auton. Region: same locality as the holotype, 1 female, 31. viii. 1971; 3 females, 29. viii. 1971; 1 female, 27. viii. 1971. Ximeng: 1 female, Huangqi, 9. viii. 1987 (G-w. Siqin); 1 male, Erlianhaote, 8. viii. 1972;

1 male, Taiqi, 14. viii. 1987 (Siqin); 1 female, Dongsuqi, 28. vii. 1987 (Buhebateer); 1 female, Daaobao, 16. viii. 1979 (Y-l. Chen). Bameng: 1 male, Zhongqi, 31. vii. 1985 (Huhe); 1 male, 15. viii. 1971 (Y-w. Zhang). Apaka, ix. 1939 (K. Tsuneki). Gansu Province: 1 male, Sunan, 2250-2400 m, 21. viii. 1957 (Zhang Yiran).

Remarks: This species is somewhat similar to *Andrena fuscipes* (Kirby), but is easily recognized by the smaller size, the metasomal terga and legs ferruginous, the facial fovea white above, the process of labrum weakly emarginate, the clypeus less convex medially and smooth to weakly tessellate with sparser punctures and with impunctate longitudinal line and the vertex without blackish hairs.

Distribution: China (Inner Mongol Auton. Region, Gansu Prov.).

Floral association: Not available.

Flight records: Female: late July to September; male: late July to late August.

Etymology: The specific name is dedicated to Mr. Friz Gusenleitner of Linz, Austria who has contributed to study on westpalearctic fauna of the genus *Andrena*.

5. *Andrena (Cnemidandrena) carinigera* Wu

(Figs. 11: A-E)

Andrena (Andrena) carinigera Wu, 1982, Insects of Xizang, vol. 2. Apoidea, 390 [female & male, China]; Gusenleitner & Schwarz, 2001, Entomofauna, 22: 284-285.

Redescription.

Female: BL 11.3-12.0 mm, WL 9.5-10.2 mm (n=5).

Color: Flagellum dark brown beneath; mandible with apical fourth reddened; wing membranes infumate, veins and pterostigma brown; tibial spurs yellow; posterior depressions of metasomal terga brownish transparent.

Pubescence: Hairs on head not dense, pale yellow, those on face along inner margin of eye and vertex mixed with black ones; those on clypeus scanty, long (400-600 μ) at extreme angle; those on vertex 600-800 μ , pale yellow; those on genal area sparse, dull white; facial fovea brown above, paler below. Hairs on thorax dense; those on mesoscutum and scutellum 500-800 μ , yellow mixed with sparse blackish ones; those on mesepisternum pale yellow; propodeal corbicula completely developed, pale yellow mixed with brownish, internal with sparse simple hairs anteriorly; trochanteral floccus imperfect, pale yellow; femoral floccus dense; tibial scopal hairs short, simple, brown. Hairs on metasomal terga sparse, erect; those on tergum 1 long, pale yellowish; those on terga 2-4 short, whitish narrowly basally, short, blackish apically; terga 2-4 with short, dense, appressed, white hair bands; caudal fimbria black; sterna 2-4 with long, white subapical fimbriae and also with short, white, apical hair fringes.

Structure: Head: HL/HW = 1.08. HW: MsW: MtW = 3.3: 3.2: 3.4. Vertex roughened with PP: POD: OCD = 0.68: 0.5: 0.26. FL1 > FL2+3, FL2 < FL3, which is as long as broad, intermediate segments longer than broad. Eyes with inner margins subparallel. Facial fovea broad, extending to below a line at lower margin of antennal fossae, FVL = 1.0 mm, FVW = 0.5 mm. Supraclypeal area densely punctate with close minute PP. Face above antennal fossae with dense longitudinal rugulae and weak interrugal PP, shagreening surface. Facial quadrangle as broad as long (about 3.5: 3.5). Clypeus strongly convex medially, smooth and shiny nearly all over, surface with PP ϕ 20-30 μ , IS > 1, shiny space apicomedia, median without longitudinal impunctate space, CPL = 1.1 mm. Process of labrum broad basally, deeply emarginate apically. Labrum apical to process with distinct cristae. Lower paraocular area smooth and shiny with close small PP. Malar space nearly linear. Genal area broader than eye, GW: EW = 0.9: 0.75, surface weakly tessellate

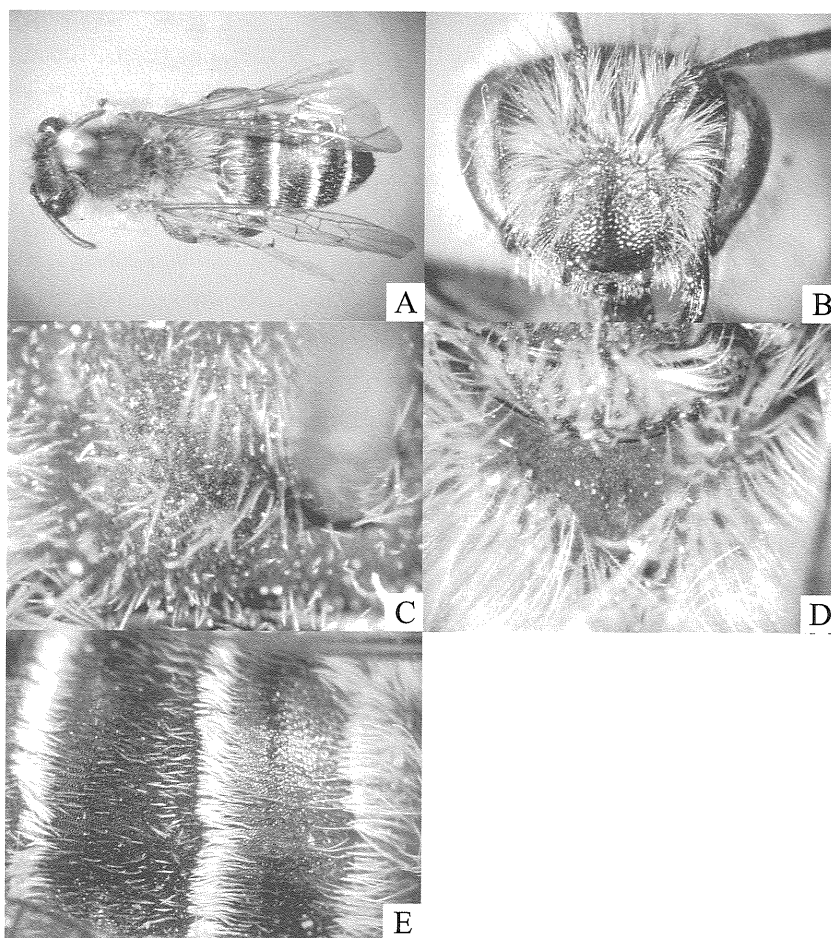


Fig. 11: A - E. *Andrena (Cnemidandrena) carinigera* Wu, female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

posteriorly with weak minute $PP\phi 20\mu$, $IS = 1-2$, shiny with close, linear minute PP near eye. *Mesosoma*: Pronotum with dorsal surface densely tessellate with weak minute $PP\phi 20\mu$, $IS = 1-2$. Mesoscutum very densely tessellate and weakly punctate with fine $PP\phi 20\mu$, $IS = 1-2$ medially. Scutellum smooth and shiny, scattered with small PP. Propodeal enclosure densely tessellate nearly all over, indistinctly rugose basally; dorsal face of propodeum densely tessellate, minutely punctate. Mesepisternum densely tessellate with weak $PP\phi 20\mu$, $IS = 1$. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga densely tessellate; terga 1-4 with shallow, microscopic $PP\phi 20\mu$, $IS = 1-2$, apical areas tessellate; posterior depressions of terga well indicated; pygidial plate V-shaped with large raised triangular area. Sterna 2-5 finely tessellate with fine $PP\phi 20\mu$, $IS = 1$.

Male: Not available in this study.

Specimens examined: CHINA: Xizang Province: 3 females, Langxian, 3100 m, 5. viii. 1981 (T-l. Chen); 1 female, Linzhi, 3050 m, 1. viii. 1983 (Y-h. Han). Yunnan Province: 1 female, southwest region, vi. 1960.

Remarks: This species is similar to *Andrena denticulata denticulata* (Kirby) in having the metasomal terga with short, dense, whitish apical hair bands and the mesoscutum mixed with blackish hairs. But it can be separated from *A. d. denticulata* by the clypeus strongly convex with impunctate polished space medioapically, the vertex and thorax with much more whitish hairs and the propodeal enclosure less rugosed.

Distribution: China (Xizang, Yunnan Provs.).

Floral association: Not available.

Flight records: Female: June to early August; male: early June to mid July.

6-1. *Andrena (Cnemidandrena) denticulata denticulata* (Kirby)

Melitta denticulata Kirby, 1802, Monogr. Apum Angl., 2: 133-134 [male, England].

Andrena denticulata Illiger, 1806, Mag. Insektenk., 5: 68 [female]; Stöckert, 1930, Hym. Nord.und Mitteleur., 928, 972-973 [female & male, in key].

Andrena (Cnemidandrena) denticulata denticulata: Osytshnjuk, 1995, Key Insects Russian Far East, Six Vol., 4: 510, 521 [female & male, in key].

Specimens examined: CHINA: Xinjiang Uygur Autn. Region: 1 female, Altai, 1,750 m, 6. viii. 1960 (S-y. Wang). Jilin Province: 2 males, Baihe, Changbaishan, 30-31. vii. 1981 (Y-r. Wu), 2 females, 4-5. viii. 1981 (Y-r. Wu). Heilongjiang Province: 1 male, Boketu, 29. vii. 1937.

Remarks: This species is easily recognized by the thorax with blackish hairs in both

sexes, and the vertex angulate laterally, the clypeus flat, the genal area with projections near base of mandibles and strongly carinate posteriorly in male.

Distribution: China (new record: Xinjiang Uygur Autn. Region, Jilin, Heilongjiang Provs.); Russia (Far East Area); Europe.

Floral association: China: *Vicia unijuja*.

Flight records: China: Female: early August; male: late July.

6-2. *Andrena (Cnemidandrena) denticulata seneciorum* Hirashima

Andrena (Cnemidandrena) seneciorum Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 40-43 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 98, 118 [female & male, in key]; Kim, Ill. Fauna & Flora Korea, 11(3): 661 [Korea].

Andrena (Cnemidandrena) denticulata seneciorum: Osytshnjuk, 1995, Key Insects Russian Far East Six Vol., 4: 510, 521 [female & male, in key]; Tadauchi *et al.*, 1997, Esakia, (37): 200 [in list].

Description. See Hirashima (1964):

Photos. See Tadauchi *et al.* (2001): <http://konchudb.agr.agr.kyushu-u.ac.jp/hanabachi/>

Type material examined: Holotype male and allotype female (Entomol. Lab., Kyushu Univ., Fukuoka), Nukabira, Tokachi, Hokkaido, Japan, 1-4. viii. 1953 (Y. Hirashima). Other material: JAPAN: Honshu: 3 females, Tamagawa Spa, Akita Pref., 19. viii. 1979 (Y. Maeta); 1 female, Mt. Hayachine, Iwate Pref., 31. vii. 1979 (Y. Maeta); 3 females, Ashiro, Iwate Pref., 6. ix. 1979 (Y. Maeta). CHINA: Shannxi Province: 1 female, Fuping, 9. viii. 1973 (X-z. Zhang).

Remarks: This subspecies is different from the nominate subspecies by the metasomal terga with longer dull yellowish hair bands, the thorax and metasomal terga 1-2 with more dull yellowish long hairs and the genal area with weaker projections near mandibles in male.

Distribution: China (new record: Shannxi Prov.); Japan (Hokkaido, Honshu, Kyushu); Korea (south); Russia (Far East area).

Floral association: Japan: *Senecio palmatus*, *Senecio cannabifolius*, *Aster glehni*, *Picris hieracioides* var. *glabrescens*, *Erigeron annuus*.

Flight records: Japan: Female: late July to early September; male: early August.

7. *Andrena (Cnemidandrena) granulitergorum* n. sp.

(Fig. 12: A-E)

Female: BL 10.0-11.7 mm, WL 9.2-9.7 mm (n=15).

Color: Flagellum ferruginous beneath except FL1-2; mandible with apical third reddened; wing membranes subhyaline, slightly brownish, veins and pterostigma reddish brown; tibial spurs yellowish; posterior margins of terga brown transparent.

Pubescence: Hairs on head 500-750 μ , moderately dense, yellowish except on face along inner sides of eyes, antennal region and vertex brownish; facial fovea dark brown. Hairs on thorax dense; those on mesoscutum and scutellum 500-700 μ , dull yellow mixed with brownish; those on mesepisternum 600-900 μ , pale yellow; propodeal corbicula completely developed, dorsal fringes yellow mixed with brown, internal without hairs; trochanteral floccus perfect, white; femoral floccus dense; tibial scopal hairs rather short, simple, yellowish brown; basitarsi with brown hairs. Hairs on metasomal terga 1-2 moderately long, yellow; those on terga 3-4 short, black except basal and lateral area,

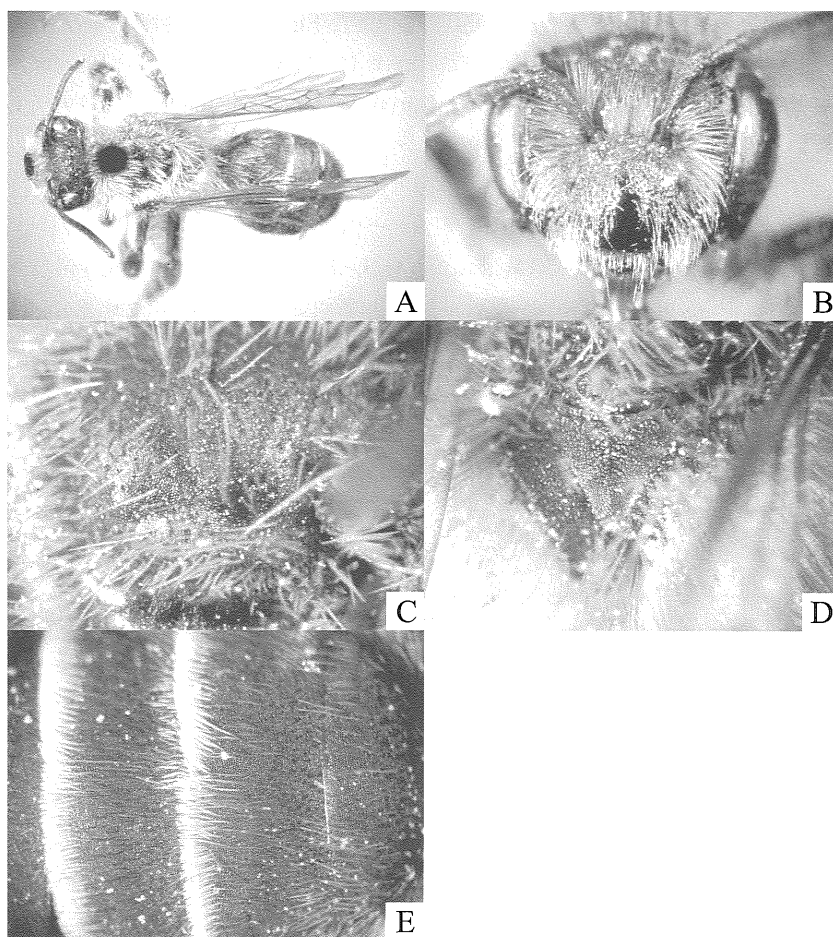


Fig. 12: A - E. *Andrena (Cnemidandrena) granulitergorum* n. sp., female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

yellow; terga 2-4 with short, complete pale yellowish hair bands; caudal fimbria brown to black; sterna 2-5 with long, incomplete yellow subapical fimbriae.

Structure: Head: HL/HW = 0.77. HW: MsW: MtW = 2.9: 2.9: 3.3. Vertex densely tessellate, dulled above lateral ocelli. OOD: POD: OCD = 0.65: 0.35: 0.25. FL1 < FL2+3, FL2 < FL3 which is as long as broad, intermediate segments longer than broad. Eyes with inner margins subparallel. Facial fovea extending to below a line at lower margin of antennal fossae, FVL = 1.1 mm, FVW = 0.45 mm. Supraclypeal area roughened with coarse minute PP. Face above antennal fossae with longitudinal rugulae and coarse interrugal PP, dulling surface. Facial quadrangle slightly broader than long (about 2.1: 1.9). Clypeus well convex, weakly tessellate and densely punctate laterally with PP ϕ 20-40 μ , IS < 0.5, median with broad impunctate space, which broader toward apical margin, smooth and shiny, CPL = 1.0 mm. Process of labrum moderate, trapezoidal, apex convex and weakly emarginate. Labrum apical to process flat, smooth and shiny with median cristae. Lower paraocular area smooth and shiny with close minute PP. Malar space nearly linear, broader posteriorly. Genal area broader than eye, GW: EW = 0.8: 0.7, surface broadly finely tessellate posteriorly, narrowly smooth and shiny with minute PP near eye. *Mesosoma:* Pronotum weakly tessellate, broadly shiny with minute PP, irregular in distribution. Mesoscutum finely granulate anteriorly, densely tessellate posteromedially, with sparse, shallow small PP, IS = 1-3 or more. Scutellum weakly to finely tessellate, shiny with PP obscured. Propodeal enclosure well defined, finely granulate, weakly rugulose at basal 1/3 to 1/2, median with a longitudinal strong ruga toward apex; dorsal face of propodeum convex outwardly, shagreened with minute PP, IS = 1. Mesepisternum densely tessellate with sparse obscure PP medially. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. *Metasoma:* Metasomal terga densely granulate, surface opaque; tergum 1 with scattered minute PP, irregular in distribution and shiny around PP, PP on terga 3-4 obscure; posterior depressions of terga not well indicated; pygidial plate V-shaped with rounded apex, internal with raised triangular area. Sterna 2-5 weakly tessellate, broadly shiny, impunctate basally, finely punctate with minute PP apically.

Male: Unknown.

Type material: Holotype female: Yuhu, 2,750 m, Lijiang, Yunnan Province, China, 22. vii. 1984 (J-g. Fan). Paratypes: CHINA: Yunnan Province: same locality and collector as the holotype: 3 females, 22. vii. 1984; 1 female, 23. vii. 1984; 2 females, 24. vii. 1984; 1 female, 24. vii. 1984 (R-q. Wang); 1 female, Lude, 2,400 m, Yongsheng, 10. vii. 1984 (S-y. Wang); 2 females, 10. vii. 1984 (J-g. Fan); 1 female, Xuedian, 2,860 m, Lijiang, 11. viii. 1984 (J-g. Fan); 1 female, Weixipantian, 2,920 m, 22. vii. 1981 (S-y. Wang). Sichuan Province: 2 females, Xingxin, 2,000 m, Ludin, 17. ix. 1982 (S-y. Wang).

Remarks: This species is similar to *Andrena carinigera* Wu in having the metasomal

terga densely granulate with dense, short, appressed pale yellow hair bands, but is recognized by the clypeus with distinct, broad, shiny impunctate space and the propodeal enclosure less rugosed.

Distribution: China (Yunnan, Sichuan Provs.).

Floral association: *Potentilla* sp.

Flight records: Female: early July to mid September.

Etymology: The specific name is derived from the feature of metasomal terga strongly granulate.

8. *Andrena (Cnemidandrena) maetai* Hirashima

Andrena (Cnemidandrena) maetai Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 43-45 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 98-99, 118 [female & male, in key]; Osytsnjuk, 1995, Key Insects Russian Far East Six Vol. 4: 510, 521 [female & male, in key].

Description. See Hirashima (1964).

Photos. See Tadauchi *et al.* (2001): <http://konchudb.agr.agr.kyushu-u.ac.jp/hanabachi/>

Type material examined: Holotype male and allotype female, 19 paratype females (Entomol. Lab., Kyushu Univ., Fukuoka), Mt. Ariake, Tsushima Is., Japan, 10. x. 1953 (Y. Maeta). Other material: JAPAN: Kyushu: 1 female, near Iizuka City, Fukuoka Pref., 18. xi. 1972 (Y. Hirashima); 1 male, same locality as above, 7. xi. 1972 (Y. Hirashima); 3 females, Tagawa-gun, Fukuoka Pref., 30. x. 1973 (K. Takeno); 1 female, same locality and date as above (M. T. Chujo); 1 male, same locality as above, 26. x. 1974 (M. T. Chujo).

Remarks: This species is similar to *Andrena denticulata* (Kirby) in having the vertex angulate laterally (weakly indicated in this species) and the clypeus flat in male. But it is separated by the smaller size and the flagellar segments reddish yellow beneath in both sexes, the process of labrum weakly emarginate, the mesoscutum less tessellate with less blackish hairs medially and the facial fovea brown in female, the metasomal sterna 2-5 with long curled subapical fringes in male.

Distribution: Japan (Kyushu, Tsushima Is.); Russia (Far East area).

Floral association (Japan): *Lactuca denticulata*; *Solidago altissima*.

Flight records: Japan: Female: early October to mid November; male: early October to early November.

9. *Andrena (Cnemidandrena) latigera* Wu

Andrena (Andrena) latigera Wu, 1982, Insects of Xizang, vol. 2. Apoidea, 391 [male,

China]; Gusenleitner & Schwarz, 2001, Entomofauna, 22: 302.

Male: Not available in this study. Redescription: See Gusenleitner & Schwarz (2001).

Remarks: Wu (1982) described this species from Tibet, China and noted it was similar to *Andrena nigriceps* (Kirby), but was different from it by the head and thorax with black hairs, the metasomal terga 3-5 with black hairs, the mid and hind tarsi reddish yellow, and the male genitalia.

Distribution: China (Xizang Prov.).

Floral association: Not available.

Flight records: Male: early August.

10. *Andrena (Cnemidandrena) gigantimurus* n. sp.

(Fig. 13: A-E)

Female: BL 10.2 mm, WL 8.4 mm (n=1).

Color: Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes infumate, veins and pterostigma yellowish brown; tibial spurs yellow; posterior depressions of metasomal terga brownish transparent.

Pubescence: Hairs on head not dense, pale yellow, those on face along inner margin of eye and vertex mixed with brownish; those on clypeus scanty, short (200-400 μ) at extreme angle; those on vertex 500-1000 μ , pale brown; those on genal area sparse, pale yellow; facial fovea brown above, paler below. Hairs on thorax not dense; those on mesoscutum and scutellum 300-600 μ , brownish yellow peripherally, black medially; those on mesepisternum pale yellow; propodeal corbicle completely developed, yellowish, internal without hairs; trochanteral floccus imperfect, yellowish; femoral floccus dense; tibial scopal hairs short, simple, yellowish brown. Hairs on metasomal terga moderate, erect; those on terga 1-2 long, pale yellowish; those on terga 3-4 very short, pale brownish; terga 2-4 with long, loose, pale yellow hair bands; caudal fimbria brown; sterna 2-4 with long, incomplete, pale yellowish, subapical fimbriae.

Structure: *Head:* HL/HW = 0.74. HW: MsW: MtW = 3.0: 2.8: 3.1. Vertex finely tessellate with fine rugulae. OOD: POD: OCD = 0.75: 0.55: 0.3. FL1 = FL2+3, FL2 = FL3, which is as long as broad, intermediate segments longer than broad. Eyes with inner margins subparallel. Facial fovea not broad, extending to below a line at lower margin of antennal fossae, FVL = 0.9 mm, FVW = 0.3 mm. Supraclypeal area densely tessellate. Face above antennal fossae with dense longitudinal rugulae and weak interrugal PP, shagreening surface. Facial quadrangle broader than long (about 2.5: 2.65). Clypeus weakly convex medially, weakly tessellate basally, very weakly and shiny apically, surface with sparse, shallow PP ϕ 20-30 μ , IS = 0.5-3, irregular in distribution, nearly impunctate

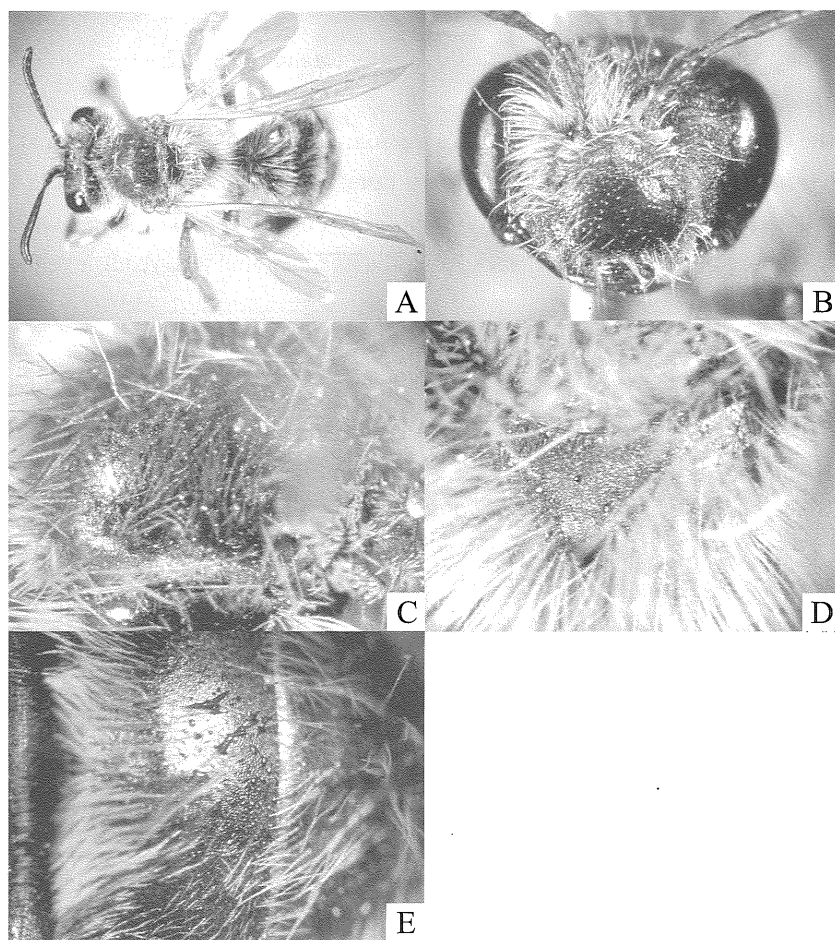


Fig. 13: A - E. *Andrena (Cnemidandrena) gigantomurum* n. sp., female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

medioapical broad area, CPL = 1.0 mm. Process of labrum trapezoidal, broadly convex apically, deeply emarginate apically. Labrum apical to process with distinct cristae. Lower paraocular area smooth and shiny with small, sparse PP. Malar space nearly linear. Genal area broader than eye, GW: EW = 0.95: 0.65, surface densely tessellate posteriorly with weak indistinct PP, IS = 1.5-2, shiny with close, linear minute PP near eye. *Mesosoma*: Pronotum with dorsal surface densely tessellate with weak minute PP, IS = 1-2. Mesoscutum densely tessellate anteriorly, weakly tessellate and feebly shiny with sparse, small PP $\approx 20\mu$, IS = 1-3, medially. Scutellum smooth and shiny, scattered with small PP. Propodeal enclosure well defined, densely tessellate at apical 4/5, weakly rugulose at basal 1/5; dorsal face of propodeum densely tessellate, with indistinct PP. Mesepisternum densely tessellate with weak PP $\approx 20\mu$, IS = 1-3. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga weakly tessellate and feebly shiny; terga 1-4 with

indistinct, microscopic $PP\phi 20\mu$, $IS = 1-4$; posterior depressions of terga weakly indicated; pygidial plate V-shaped with large raised triangular area. Sterna 2-5 finely tessellate with fine PP, $IS = 1-2$.

Type material: Holotype female, near the Great Wall, Beijing, China, 28. ix. 1995 (S. Ikudome).

Remarks: This species is similar to *Andrena gusenleitneri* n. sp. in having the clypeus weakly convex with sparse punctures, but is recognized by the legs and metasomal terga not ferruginous, the clypeus weakly tessellate with weaker, sparser punctures and with broader longitudinal impunctate space, the facial fovea brown, and the vertex with brown hairs.

Distribution: China (Beijing).

Floral association: Not available.

Flight records: Female: late September.

Etymology: The specific name is derived from the type locality, the Great Wall.

11. *Andrena (Cnemidandrena) solidago* n. sp.

(Figs. 14: A-E, 15: A-E, 16: A-E)

Female: BL 11.5-12.5 mm, WL 9.1-10.2 mm ($n=2$).

Color: Flagellum yellowish brown beneath; mandible with apical third reddened; wing membranes infumate, veins and pterostigma yellowish brown; tibial spurs testaceous; posterior depressions of metasomal terga brownish transparent.

Pubescence: Hairs on head sparse, dull white; those on clypeus scanty ($400-500\mu$) at extreme angle; those on antennal area dull whitish; those on vertex $500-700\mu$, dull white mixed with pale brown; those on genal area sparse, dull white; facial fovea brown above, paler below. Hairs on thorax not dense, coarse; those on mesoscutum and scutellum $500-750\mu$, pale yellow; those on mesepisternum dull white; propodeal corbícula completely developed, pale yellow, internal with sparse simple hairs anteriorly; trochanteral floccus imperfect, dull white; femoral floccus dense; tibial scopal hairs short, simple, brown. Hairs on metasomal terga not dense, suberect; those on terga 1-2 long, dull whitish; those on terga 3-4 short, dull whitish; terga 2-4 with long, dense, white hair bands; caudal fimbriae dull whitish mixed with brownish; sterna 2-4 with long, incomplete, dull white subapical fimbriae.

Structure: *Head*: $HL/HW = 0.85$. $HW: MsW: MtW = 3.4: 3.1: 3.4$. Vertex densely tessellate with close $PP\phi 20-30\mu$, $IS > 1$. $OOD: POD: OCD = 0.63: 0.5: 0.35$. $FL1 > FL2+3$, $FL2 < FL3$, which is slightly broader than long, intermediate segments longer than broad. Eyes with inner margins subparallel. Facial fovea narrow, extending to below a line at lower margin of antennal fossae, $FVL = 1.4$ mm, $FVW = 0.3$ mm.

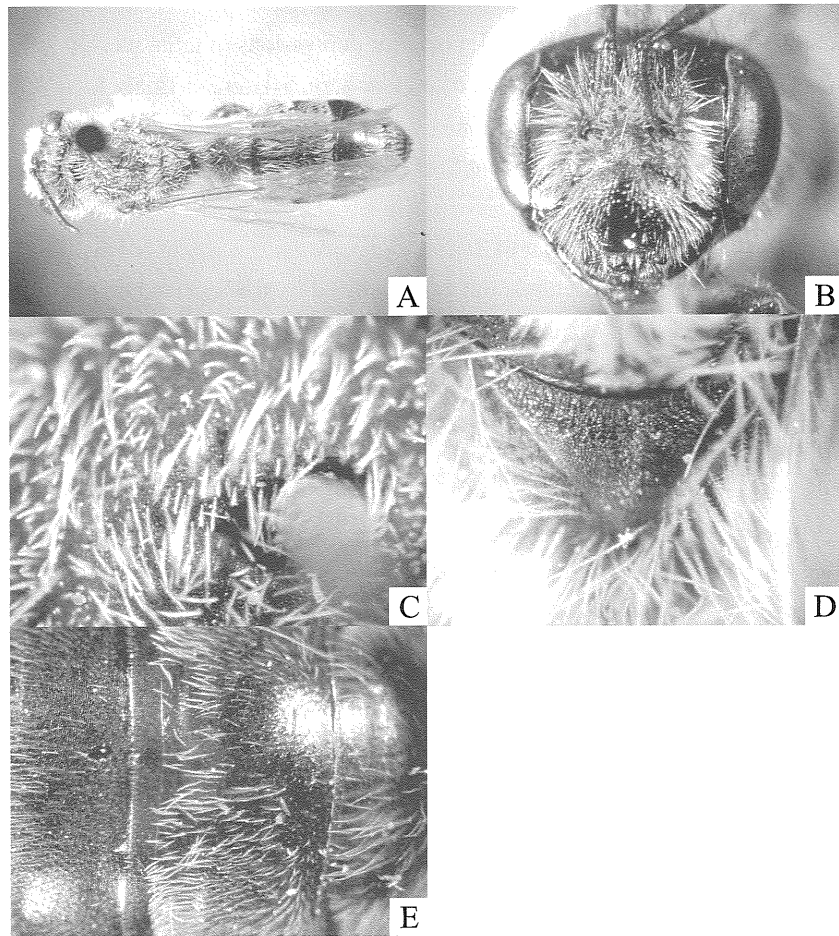


Fig. 14: A - E. *Andrena (Cnemidandrena) solidago* n. sp., female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

Supraclypeal area shagreened with minute PP. Facial quadrangle slightly longer than broad (about 2.5: 2.4). Clypeus strongly convex medially, smooth and polished nearly all over, surface with $PP\varnothing 20-30\mu$, $IS = 0.5-1$, median with broad longitudinal impunctate space, $CPL = 1.2$ mm. Process of labrum trapezoidal, \wedge shapedly convex apically, deeply emarginate apically. Lower paraocular area smooth and shiny with close small PP. Malar space linear. Genal area broader than eye, $GW: EW = 1.0: 0.8$, surface weakly tessellate posteriorly with weak minute $PP\varnothing 20\mu$, $IS = 1-2$, shiny with close, minute PP near eye. *Mesosoma*: Pronotum with dorsal surface tessellate with weak minute $PP\varnothing 20\mu$, $IS = 1-2$. Mesoscutum densely tessellate, weakly punctate with shallow $PP\varnothing 30-40\mu$, $IS = 1-2$ medially. Scutellum smooth and shiny, scattered with small PP. Propodeal enclosure densely tessellate at apical 1/2, weakly rugulose at basal 1/2; dorsal face of propodeum densely tessellate, minutely punctate. Mesepisternum weakly tessellate with a little roughened

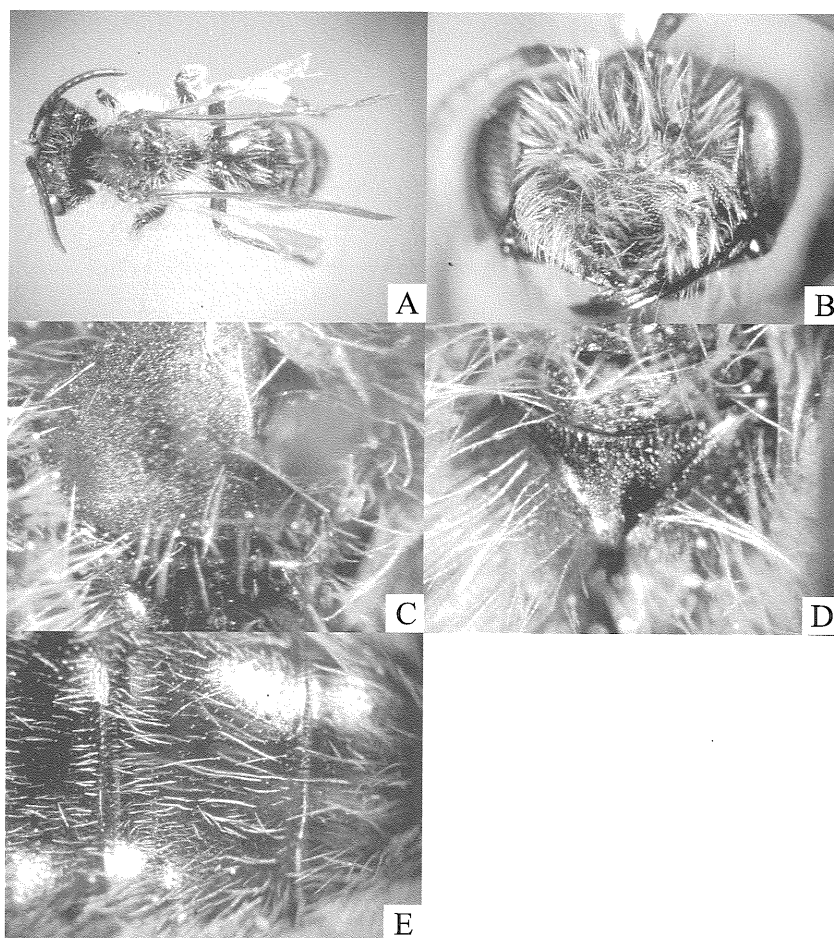


Fig. 15: A - E. *Andrena (Cnemidandrena) solidago* n. sp., male. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

weak $PP\varnothing 30\mu$, $IS > 1$. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga weakly tessellate; terga 1-4 with microscopic $PP\varnothing 20\mu$, $IS = 2-3$; posterior depressions of terga weakly indicated; pygidial plate V-shaped with large raised triangular area. Sterna 2-5 finely tessellate with fine PP, $IS = 1.5$.

Male : BL 10.2 mm, WL 7.8 mm ($n=1$).

Color: Flagellum brownish beneath; mandible with apical third reddened; wing membrane infumate, veins and pterostigma yellowish brown; tibial spurs testaceous; posterior margins of metasomal terga brownish subhyaline.

Pubescence: Hairs on head $500-700\mu$, dense, white; those on vertex mixed with pale brown. Hairs on thorax as in female. Hairs on metasomal terga sparse, shorter than in female, those on terga 1-2 whitish; those on terga 3-5 brown; terga 2-4 with sparse white hair bands; sterna 2-5 with moderately long, dense, suberect white hair bands.

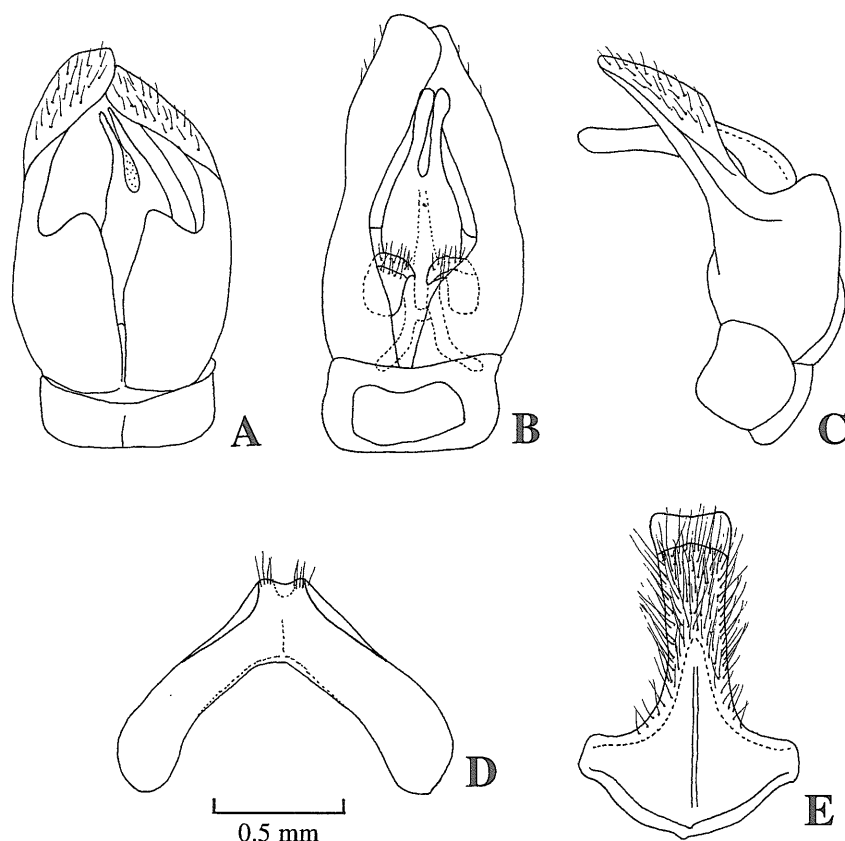


Fig. 16: A - E. *Andrena (Cnemidandrena) solidago* n. sp., male. Genital capsule and subgenital sterna. A: dorsal view of genital capsule; B: ventral view of the same; C: lateral view of the same; D: metasomal sternum 7; E: metasomal sternum 8.

Structure: Head: $HL/HW = 0.73$. $HW: MsW: MtW = 3.3: 2.8: 3.0$. Vertex not angulate laterally in frontal view, finely tessellate with fine PP, $IS = 1$. $OOD: POD: OCD = 0.7: 0.6: 0.4$. $FL1 > FL2$, $FL2$ slightly shorter than $FL3$, $FL2$ as long as broad. Eyes with inner margins subparallel. Supraclypeal area deeply punctate, shagreened. Facial quadrangle broader than long (about $2.1: 2.2$). Clypeus flat medially, surface smooth and polished with broad impunctate space medioapically, with distinct $PP \phi 30\mu$, $IS < 1$, $CPL = 0.9$ mm. Process of labrum protuberant, deeply emarginate apically. Mandibles falciform, decussate. Lower paraocular area smooth and shiny with distinct $PP \phi 20-30\mu$, $IS < 1$. Malar space linear. Genal area without projections near base of mandibles, weakly angulate posteromedially, $GW: EW = 1.1: 0.8$, surface weakly tessellate posteriorly, broadly smooth and shiny with minute $PP \phi 20\mu$, $IS = 1$ near eye. *Mesosoma:* Pronotum with dorsal face finely tessellate with irregular small PP. Mesoscutum and scutellum sculptured as in female.

Propodeal enclosure weakly tessellate at apical 2/3, weakly rugose with short, slanting rugulae at basal 1/3; dorsal face of propodeum and mesepisternum densely tessellate with sparse minute PP. Wing venation as in female. *Metasoma*: Metasomal tergum 1 weakly tessellate with sparse PP; terga 2-5 weakly tessellate, feebly shiny, surface with shallow minute PP $\approx 20\mu$, IS = 1-2; posterior depressions of terga well indicated. Sterna 2-5 sculptured as in terga; sternum 6 weakly reflected.

Type material: Female, Tagawa, Fukuoka Pref., Japan, 30. x. 1973 (M. T. Chujo). Paratypes: JAPAN: 1 male, Gokasho, 800m, Mt. Sobo, Oita Pref., 20. ix. 1979 (O. Tadauchi). CHINA: Hebei Province: 2 females, Xiheyang, 860m, 9. ix. 1964 (C-g. Wang); 1 male, Mt. Xiaowutai, 1200m, 3. ix. 1964 (C-g. Wang).

Remarks: This species is somewhat similar to *Andrena megavallata* n. sp. in having the clypeus with broad longitudinal impunctate space. But it is easily recognized by the larger size, the clypeus strongly convex and smooth and shiny with stronger punctures, the thorax and metasoma with coarser hairs and the mesoscutum densely tessellate.

Distribution: Japan (Kyushu); China (Hebei Prov.).

Floral association: Japan: *Solidago altissima*, *Circium* sp.

Flight records: Female: early September to late October; male: early to mid September.

Etymology: The specific name is derived from the associated flower, *Solidago altissima*.

12-1. *Andrena (Cnemidandrena) kishidai kishidai* Yasumatsu

(Figs. 17: A-E, 18: A-E, 19: A-E)

Andrena (Chlorandrena) kishidai Yasumatsu, 1935, Insects of Jehol, fasc. 8, Hymenoptera 2: 9-10, 42-43 [female, China]; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15: 277 [in list].

Andrena (Cnemidandrena) kishidai: Xu & Tadauchi, 1996, Bull. biogeogr. Soc. Jap., 51: 3-5 [redescription of holotype].

Andrena zonativentris Alfken, 1936, Arkiv. Zool., 27A (37):13 [female & male, China]; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15: 282 [in list].

Redescription.

Female: See Xu & Tadauchi (1996).

Male (redescription): BL 10.7 mm, WL 9.5 mm (n=1).

Color: Flagellum broadly yellowish brown beneath except FL1; mandibles with apical third reddened; wing membranes subhyaline, weakly brown, veins and pterostigma yellowish brown; tibial spurs yellowish; metasomal terga 1-3 reddish yellow at apical half; posterior margins of metasomal terga yellowish transparent.

Pubescence: Hairs on head dense; those on clypeus 600μ , dull whitish; those on antennal

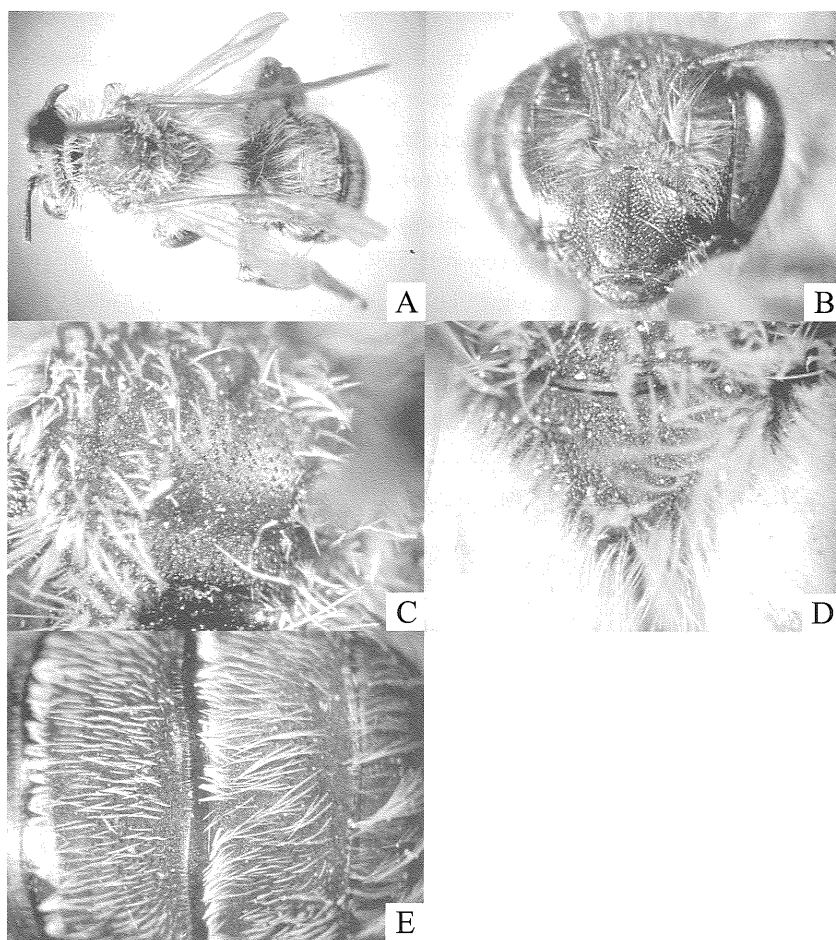


Fig. 17: A - E. *Andrena (Cnemidandrena) kishidai kishidai* Yasumatsu, female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

area pale yellowish mixed with brown; those on vertex $700-800\mu$, brown; those on genal area whitish. Hairs on mesoscutum and scutellum $500-700\mu$, coarse, not so dense, dull yellow; those on propodeum dull yellowish; those on mesepisternum long, dense, dull white. Hairs on metasomal terga 1-2 moderately long, dull yellow; those on terga 3-5 short, coarse; terga 2-4 with short, complete white hair bands; sterna 2-5 with short, complete, white subapical fimbriae.

Structure: **Head:** $HL/HW = 0.84$. $HW: MsW: MtW = 3.4: 2.8: 3.0$. Vertex tall, not angulate laterally in frontal view, finely tessellate with fine $PP\phi 10-20\mu$, $IS = 0.5-2$. $OOD: POD: OCD = 0.7: 0.4: 0.4$. $FL1$ short, longer than broad, $FL2$ and the following segments distinctly longer than broad. Eyes with inner margins paralleled. Supraclypeal area coarsely punctate. Face above antennal fossae with weak longitudinal rugulae and coarse interrugal PP , dulling surface. Facial quadrangle quadrate (about $2.3: 2.3$). Clypeus convex with a

median depressed triangular area apically, surface nearly smooth and shiny with deep, close PP $\varnothing 20\text{--}40\mu$, $IS < 0.5$, without median impunctate line, apical margin with narrow transverse impunctate space, smooth and shiny; CPL = 1.2 mm. Process of labrum distinctly reflexed, broadly excavate beneath. Mandibles long, falciform, decussate. Lower paraocular area as in clypeus. Malar space nearly linear. Genal area without projections near mandibles, distinctly angulate posteromedially, GW: EW = 1.0: 0.8, surface weakly tessellate posteriorly with sparse PP, smooth and shiny near eye with fine PP. *Mesosoma*: Pronotum with distinct humeral angle and ridge, not crossed by pronotal suture, dorsal surface reticularly shagreened. Mesoscutum finely granulate anteriorly, finely tessellate medially with weak PP $\varnothing 15\text{--}20\mu$, $IS = 1\text{--}2$. Scutellum broadly smooth and shiny, scattered with weak PP. Propodeal enclosure weakly rugulate at basal margin, densely tessellate apically; dorsal face of propodeum shagreened with shallow PP. Mesepisternum weakly tessellate with

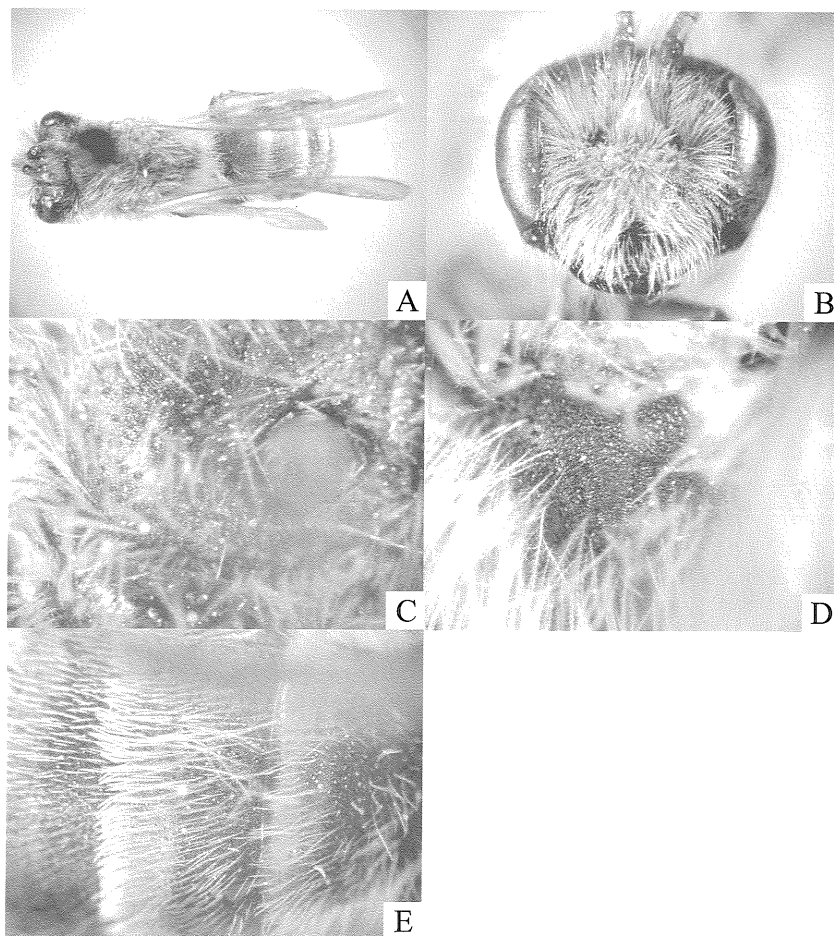


Fig. 18: A - E. *Andrena (Cnemidandrena) kishidai kishidai* Yasumatsu, male. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

shallow and weak PP $\phi 20\mu$, IS =1 or more. Vein 1st *m-cu* meeting second submarginal cell slightly beyond middle of cell. *Metasoma*: Metasomal terga densely granulate, terga 1-4 with basal areas with drip-like weak PP $\phi 15-20\mu$, usually obscured; posterior depressions of terga moderately indicated. Sterna 2-5 weakly tessellate and broadly feebly shiny with sparse minute PP; sternum 6 flat, not emarginate.

Specimens examined: Holotype female and one paratype female, Shwan-ta-shan, Jehol, China, viii. 1933 (National Science Museum, Tokyo). Other material: CHINA: Beijing: 3 females, Dongningshan, 1,100 m, 24. viii. 1991 (L-l. Yang). Hebei Province: Mt. Xiaowutai Shan: 1 female, 1,200 m, 21. viii. 1964; 1 male, 1,200-1,400 m, 23. viii. 1964 (Y-h. Han); 1 female, 12. viii. 1964 (J-l. Mao).

Remarks: This species is similar to *Andrena granuliterga* n. sp. in having the metasomal terga densely granulate. But it is characterized by the thorax and metasomal terga with

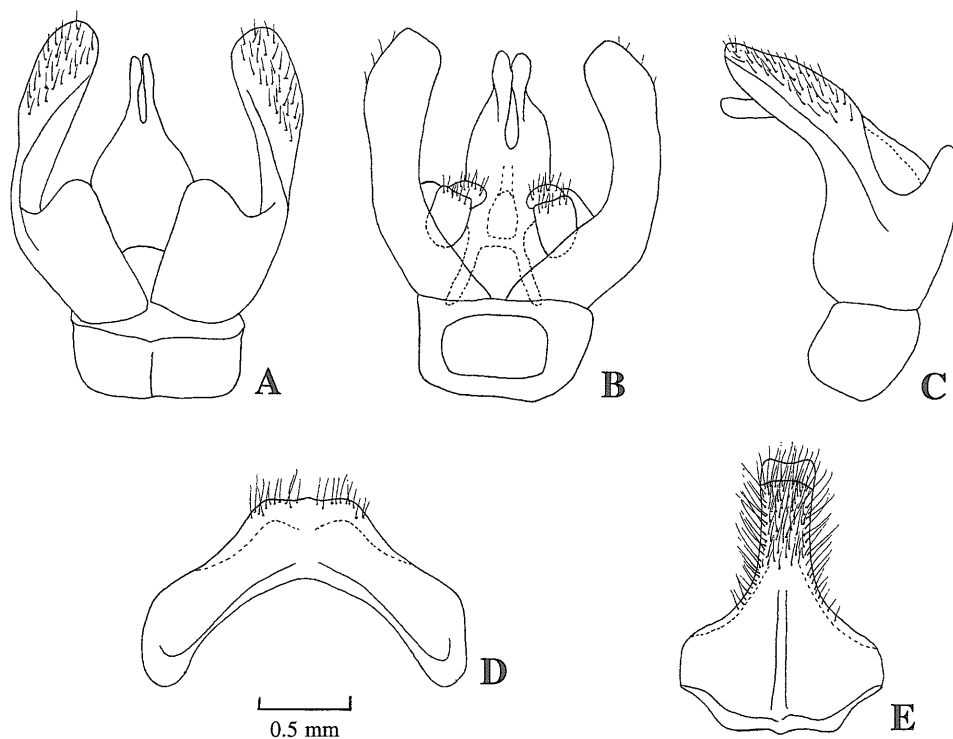


Fig. 19: A - E. *Andrena (Cnemidandrena) kishidai kishidai* Yasumatsu, male. Genital capsule and subgenital sternum. A: dorsal view of genital capsule; B: ventral view of the same; C: lateral view of the same; D: metasomal sternum 7; E: metasomal sternum 8.

coarse pale yellowish hairs, the facial fovea broader, the clypeus coarsely punctate with narrow raised impunctate space and the male FL1 shorter than FL2.

Distribution: China (Hebei, Gansu Provs., Beijing).

Floral association: Not available.

Flight records: Female: mid to late August; male: late August.

12-2. *Andrena (Cnemidandrena) kishidai chagyabensis* Wu

(Fig. 20: A-E)

Andrena (Cnemidandrena) chagyabensis Wu, 1982, Insects of Xizang, vol. 2, Apoidea, 389-390 [female & male, China]; Gusenleitner & Schwarz, 2001, Entomofauna, 22: 286-287. **n. stat.**

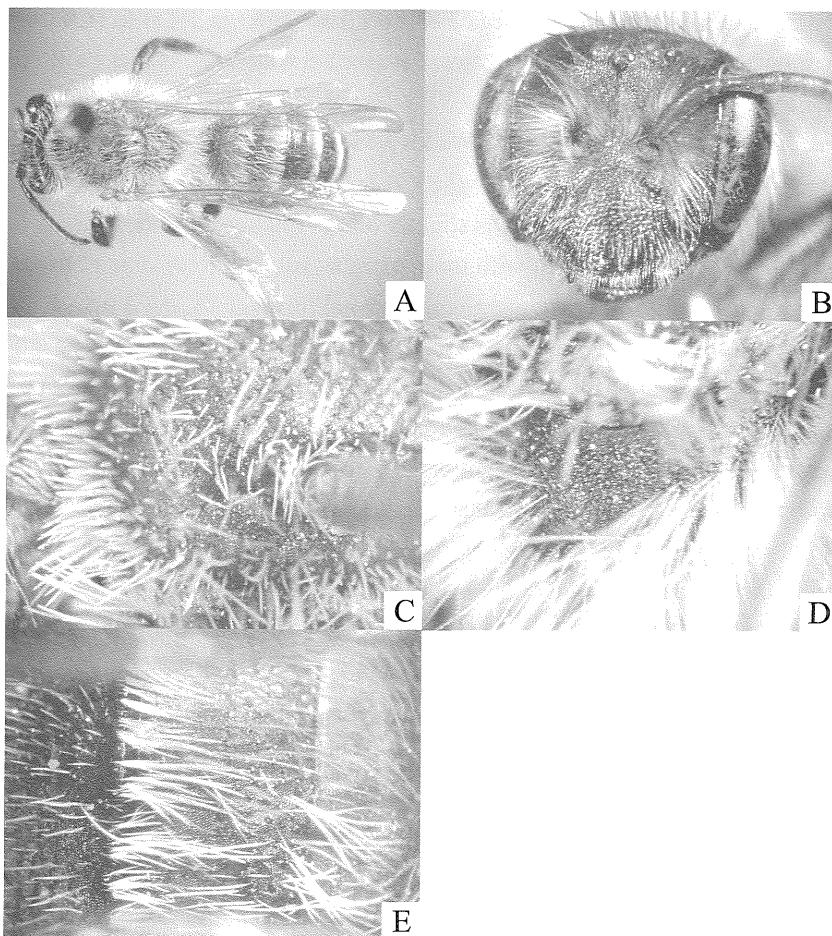


Fig. 20: A - E. *Andrena (Cnemidandrena) kishidai chagyabensis* Wu, female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

Redescription.

Female: BL 13.0 mm, WL 11.5 mm (n= 4).

Color: Flagellum yellowish brown beneath; mandibles with apical third reddened; wing membranes subhyaline weakly brownish, veins and pterostigma brown; tibial spurs yellowish; posterior margins of metasomal terga yellowish transparent.

Pubescence: Hairs on head not dense; those on clypeus 200–400 μ , dull yellow; those on antennal area mixed with brown; those on vertex 700–800 μ , brown anteriorly, yellow posteriorly; those on genal area dense, dull white; facial fovea brown. Hairs on thorax dense; those on mesoscutum and scutellum 500–700 μ , coarse, yellow; those on mesepisternum coarse, dull white; propodeal corbicula completely developed, internal without hairs; trochanteral floccus imperfect, white; femoral floccus dense; tibial scopal hairs rather short, yellowish brown to brown. Hairs on metasomal terga 1–2 moderately long, coarse, pale yellow; those on terga 3–4 short, brown; terga 2–4 with short, complete white hair bands; caudal fimbria dark brown; sterna 2–5 with long, sparse white subapical fimbriae.

Structure: Head: HL/HW = 0.83. HW: MsW: MtW = 3.2: 3.2: 3.5. Vertex roughened, coarsely punctate. OOD: POD: OCD = 0.65: 0.4: 0.3. FL1 slightly shorter than FL2+3, FL2 slightly shorter than FL3, which is slightly longer than broad, intermediate flagellar segments longer than broad. Eyes with inner margins subparallel. Facial fovea broad, extending to below a line at lower margin of antennal fossae, FVL = 1.3 mm, FVW = 0.5 mm. Supraclypeal area roughened by coarse PP. Face above antennal fossae with close longitudinal rugulae and weak interrugal PP. Facial quadrangle quadrate (about 2.2: 2.2). Clypeus nearly smooth to weakly punctate with close PP \approx 20–30 μ , IS = 0.5, median with polished, raised, impunctate space or obscure, broader toward apical margin, CPL = 1.2 mm. Process of labrum large, trapezoidal and emarginate apically, surface with weak rugulae at base. Labrum apical to process flat with distinct cristae. Lower paraocular area weakly tessellate with fine PP, IS = 1. Malar space about one fifth as long as basal mandibular width. Genal area broader than eye, GW: EW = 0.9: 0.8, surface densely tessellate posteriorly, smooth and shiny near eye, PP obscure. **Mesosoma:** Pronotum with humeral angle and ridge, which crossed by a weak pronotal suture, dorsal surface finely tessellate with shallow PP, IS = 1. Mesoscutum finely granulate, minutely punctate medially, IS = 1.5–2. Scutellum densely tessellate posteriorly, smooth and shiny anteriorly, scattered with weak PP. Propodeal enclosure coarsely rugosed at basal 2/3, densely tessellate at apical 1/3; dorsal face of propodeum shagreened with obscure minute PP. Mesepisternum weakly tessellate with obscure PP. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. **Metasoma:** Metasomal terga densely granulate, sparsely punctate with drip-like PP, IS = 3–4 basally, impunctate apically; posterior depressions of terga moderately indicated; pygidial plate V-shaped, internal with raised triangular area. Sterna 2–5 weakly tessellate,

closely punctate basally with minute PP, IS = 1, impunctate apically.

Male: Not available in this study.

Specimens examined: CHINA: Xizang Province: 1 female, Yadong, 2,800 m, 9. ix. 1961 (L-y. Wang). Yunnan Province: Weixipantian: 1 female, 2,500 m, 27. vii. 1981 (S-b. Liao); 1 female, 2,920m, 20. vii. 1981 (S-y. Wang); 1 female, 2,500m, 28. vii. 1981 (S-y. Wang).

Remarks: This subspecies is separated from the nominate subspecies in both sexes by the smaller size, the process of labrum weakly emarginate and the metasomal terga 3-4 with short black hairs.

Distribution: China (Xizang, Yunnan Provs.).

Floral association: Not available.

Flight records: Female: mid July to early September.

13. *Andrena* (*Cnemidandrena*) *sublisterella* Wu

(Figs. 21: A-E, 22: A-E, 23: A-E)

Andrena (*Andrena*) *sublisterella* Wu, 1982, Insects of Xizang, vol. 2. Apoidea, 388-389 [female, China].

Redescription.

Female: BL 11.2-13.5 mm, WL 8.5-10.0 mm (n=15).

Color: Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes infumate, veins and pterostigma dark brown; tibial spurs testaceous; posterior depressions of metasomal terga brownish transparent.

Pubescence: Hairs on head not dense, white to dull yellow; those on face along inner margin of eye and vertex mixed with black ones; those on clypeus scanty, short (200-400 μ) at extreme angle; those on antennal area whitish; those on vertex 500-1000 μ , dull yellow; those on genal area sparse, white; facial fovea brown. Hairs on thorax dense; those on mesoscutum and scutellum 500-750 μ , light reddish yellow; those on mesepisternum pale yellow to whitish; propodeal corbicula completely developed, white mixed with sparse brown, internal with sparse simple hairs anteriorly; trochanteral floccus imperfect, silver white; femoral floccus dense; tibial scopal hairs short, simple, brown. Hairs on metasomal terga sparse, erect; those on terga 1-2 long, whitish; those on terga 3-4 short, blackish; terga 2-4 with long, loose, white hair bands; caudal fimbria brown; sterna 2-4 with long, white subapical fimbriae, sternum 5 with light brown hairs.

Structure: Head: HL/HW = 0.86. HW: MsW: MtW = 3.5: 3.5: 4.0. Vertex finely tessellate with fine PP, IS = 1-2. OOD: POD: OCD = 0.8: 0.55: 0.4. FL1 = FL2+3, FL2 <

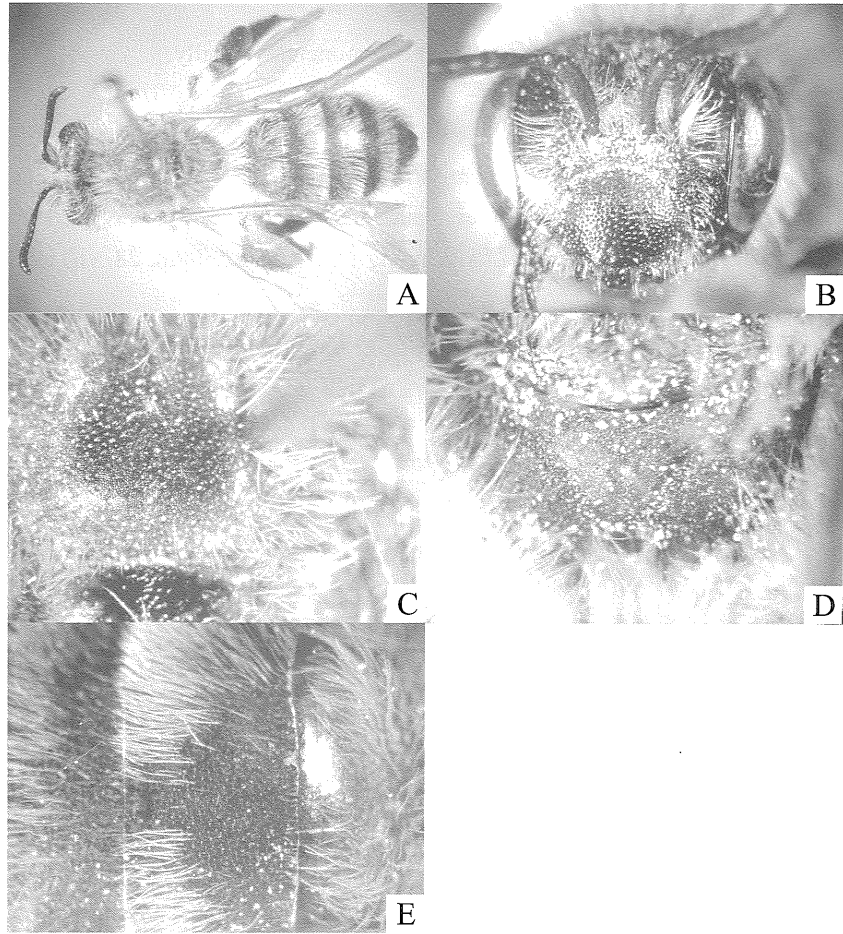


Fig. 21: A - E. *Andrena (Cnemidandrena) subliterella* Wu, female. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

FL3 which is as long as broad, intermediate segments as long as broad. Eyes with inner margins subparallel. Facial fovea broad, extending to below a line at lower margin of antennal fossae, FVL = 1.5 mm, FVW = 0.6 mm. Supraclypeal area dulled by coarse minute PP. Face above antennal fossae with dense longitudinal rugulae and weak interrugal PP, shagreening surface. Facial quadrangle as broad as long (about 2.5: 2.5). Clypeus well convex medially, finely tessellate, surface with PP $\approx 20\mu$, IS = 1-1.5, sparser medioapically, median with or without longitudinal impunctate space, CPL = 1.3 mm. Process of labrum deeply emarginate apically. Labrum apical to process with distinct cristae. Lower paraocular area smooth and shiny with close small PP. Malar space nearly linear. Genal area broader than eye, GW: EW = 1.0: 0.85, surface densely tessellate posteriorly with weak minute PP, IS = 1-2, shiny with close, minute PP near eye. *Mesosoma*: Pronotum with dorsal surface weakly tessellate with weak minute PP, IS = 1-2. Mesoscutum densely tessellate anteriorly,

weakly tessellate with fine PP, IS = 1 medially. Scutellum smooth and shiny, scattered with small PP. Propodeal enclosure well defined, densely tessellate at apical 1/2 to 3/4, weakly rugulose at basal 1/4 to 1/2; dorsal face of propodeum densely tessellate, minutely punctate. Mesepisternum densely tessellate with weak PP, IS = 1-3. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga densely tessellate; terga 1-4 with microscopic PP, IS = 1.5-3, apical areas nearly impunctate; posterior depressions of terga well indicated; pygidial plate V-shaped with large raised triangular area. Sterna 2-5 finely tessellate with fine PP, IS = 1.5.

Male (new to science): BL 10.0-12.0 mm, WL 8.2-9.0 mm (n=4).

Color: Flagellum brownish beneath; mandible with apical third reddened; wing membrane moderately brown, veins and pterostigma dark brown; tibial spurs yellow; posterior margins of metasomal terga reddish brown subhyaline.

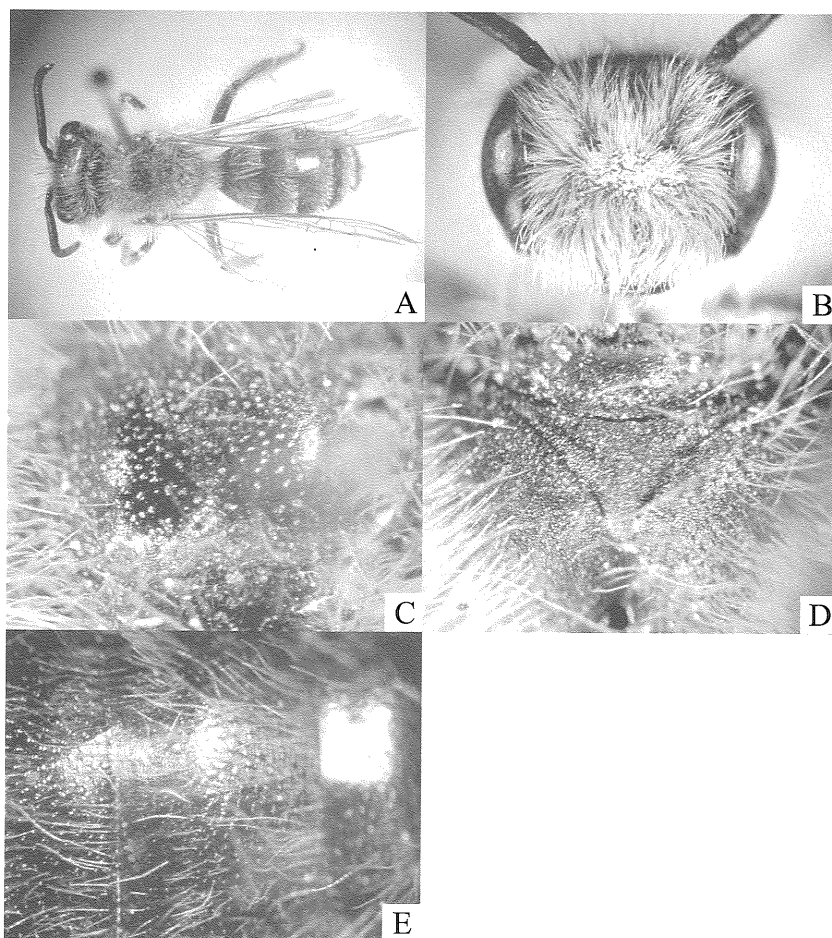


Fig. 22: A - E. *Andrena (Cnemidandrena) sublisterella* Wu, male. A: general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

Pubescence: Hairs on head 500-750 μ , dense, white; those on antennal area and vertex mixed with brown. Hairs on thorax as in female. Hairs on metasomal terga moderately dense, shorter than in female, those on terga 1-3 whitish; those on terga 4-5 brown; terga 2-4 with suberect sparse white hair bands; sterna 2-5 with sparse, erect, white hairs, with short white subapical fimbriae.

Structure: Head: HL/HW = 0.84. HW: MsW: MtW = 3.2: 2.7: 3.0. Vertex not angulate laterally in frontal view, finely tessellate above lateral ocelli, smooth and shiny near top of eye, with fine PP, IS = 1. OOD: POD: OCD = 0.7: 0.5: 0.4. FL1 > FL2, FL2 slightly shorter than FL3, FL2 longer than broad. Eyes with inner margins subparallel. Supraclypeal area deeply punctate, shagreened. Face above antennal fossae as in female. Facial quadrangle as broad as long (about 2.2: 2.2). Clypeus weakly convex medially, concave medioapically, surface smooth and shiny with close PP \approx 20 μ , sparser PP, IS = 1

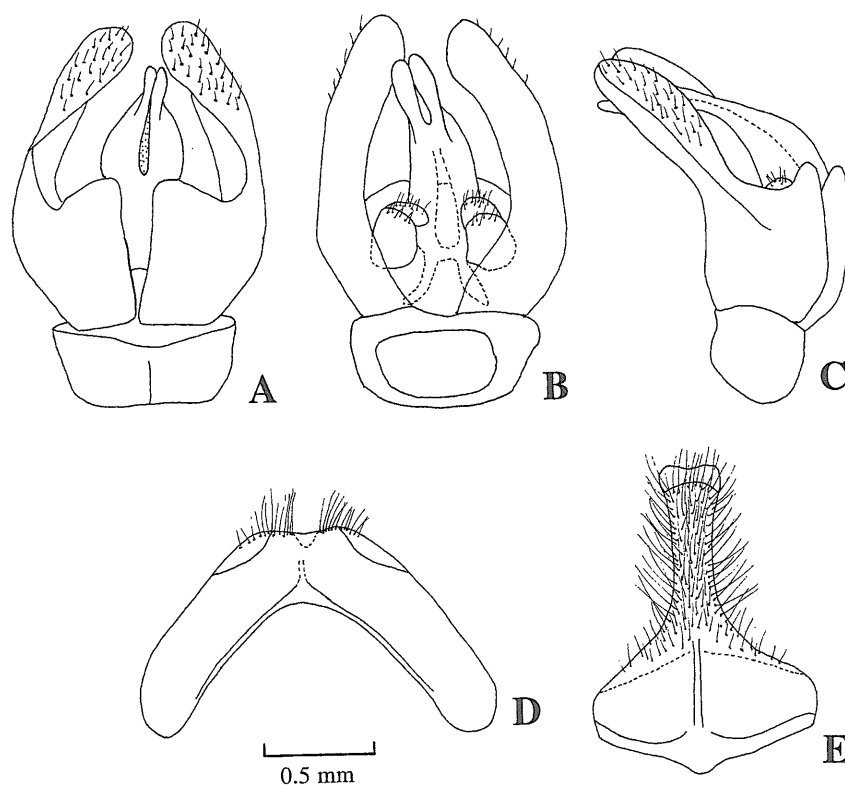


Fig. 23: A - E. *Andrena (Cnemidandrena) subliterella* Wu, male. Genital capsule and subgenital sterna. A: dorsal view of genital capsule; B: ventral view of the same; C: lateral view of the same; D: metasomal sternum 7; E: metasomal sternum 8.

near apical margin, CPL = 1.1 mm. Process of labrum protuberant, emarginate apically. Labrum apical to process with crista. Mandibles falciform, decussate. Lower paraocular area smooth and shiny with fine PP, IS = 0.5-1. Malar space linear. Genal area without projections near mandibles, angulate posteromedially, GW: EW = 1.1: 0.75, surface densely tessellate posteriorly, smooth and shiny with minute PP, IS = 1.2 near eye. *Mesosoma*: Pronotum with distinct humeral angle and ridge, dorsal face finely tessellate with irregular small PP. Mesoscutum and scutellum sculptured as in female. Propodeal enclosure densely tessellate at apical 1/2, weakly rugose with short, slanting rugulae at basal 1/2; dorsal face of propodeum and mesepisternum densely tessellate with sparse minute PP. Wing venation as in female. *Metasoma*: Metasomal tergum 1 finely tessellate with sparse PP; terga 2-5 weakly tessellate, broadly shiny, surface with shallow minute PP, IS = 2-3; posterior depressions of terga well indicated. Sterna 2-5 sculptured as in terga; sternum 6 weakly reflected.

Specimens examined: CHINA: Qinghai Province: Jiayi, 3,150 m, Qinghai Lake, 15. viii. 1996: 3 females and 1 male (H-l. Xu); 8 females and 2 males (S. Ikudome); 1 male, Gangca, 14. viii. 1996 (S. Ikudome); 1 female, Xining, 21. vii. 1950. Gansu Province: 1 female, Yongchang County, 2,300 m, 11. viii. 1996 (H-l. Xu), 1 female, Mingle, 12. viii. 1996 (S. Ikudome); Jiuquan, 1400m, 25. viii. 1957 (Zhang Yiran). Hebei Prov.: 1 female, Mt. Xiaowutai, 1200 m, 29. viii. 1964 (C-g. Wang). Inner Mongol Auton. Reg.: 1 female, Humeng, 2. viii. 1981 (D-x. Liao); 1 female, Ximeng, Xiwuqi, 12. viii. 1987 (W-j. Wang); 1 female, Ximeng, 4. viii. 1980 (S-f. Wang). Xinjiang Uygur Auton. Region: 1 female, Alatai, 1,750 m, 6. viii. 1960 (S-y. Wang).

Remarks: This species is similar to *Andrena gobi* n. sp. in having the metasomal terga 3-4 with long, erect hairs, but is recognized by the clypeus without impunctate longitudinal space, the facial fovea broader and darker, the legs black and the male metasomal terga 2-5 without dense white hair fringes.

Distribution: China (Xizang, Qinghai, Gansu, Hebei Provs., Xinjiang Uygur, Inner Mongol Auton. Regions).

Floral association: *Brassica campestris*.

Flight records: Female: late July to mid August; male: mid August.

14. *Andrena (Cnemidandrena) albicaudata* Hirashima

Andrena (Cnemidandrena) albicaudata Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 89-91, 98, 118 [female & male, in key, Japan]; Osytshnjuk, 1995, Key Insects Russian Far East Six Vol., 4: 510, 521 [female & male, in key].

Description. See Hirashima (1966).

Photos. See Tadauchi *et al.* (2001): <http://konchudb.agr.agr.kyushu-u.ac.jp/hanabachi/>

Type material examined: Holotype female (Entomol. Lab., Kyushu Univ., Fukuoka), Sugadaira, 1,300-1,500 m, Shinshu (=Nagano Pref.), Japan, 30. viii. 1963 (Y. Hirashima). Other material: JAPAN: Paratype, 1 male, same data as the holotype. CHINA: Taiwan: 1 female, Kilung, Formosa, without data on date and collector.

Remarks: This species is similar to *Andrena hedini* n. sp. and *A. gobi* n. sp. But it is recognized by the male vertex weakly angulate laterally, the male clypeus flat, the female caudal fimbria yellow, the mesoscutum densely tessellate and the legs not ferruginous.

Distribution: China (new record: Taiwan); Japan (Honshu); Russia (Far East area).

Floral association: Not available.

Flight records: Japan: Female: late August; male: late August.

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