

## A Revision of the Subgenus *Taeniandrena* of the Genus *Andrena* of Eastern Asia (Hymenoptera, Andrenidae)

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**A Revision of the Subgenus *Taeniandrena*  
of the Genus *Andrena* of Eastern Asia  
(Hymenoptera, Andrenidae)<sup>1), 2), 3)</sup>**

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**Abstract.** The subgenus *Taeniandrena* of the genus *Andrena* of eastern Asia is revised, and 12 species are recorded. Three new species, *Andrena (Taeniandrena) metasequoiae*, *A. (T.) xuanzangi* and *A. (T.) steini* are described from China. *Andrena similis* Smith is firstly recorded from East Asia. Five species also occur in Europe. A key to species of *Taeniandrena* in eastern Asia is given.

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

### Introduction

The Holarctic subgenus *Taeniandrena* Hedicke is represented by 19 species (Hirashima, 1965; Warncke, 1968; Osytshnjuk, 1977, 1995; Dylewska, 1987; Schmid-Egger & Scheuchl, 1997) in the Palearctic Region, 11 species from Europe, two from North Africa, five from Central Asia, and eight from East Asia. Warncke (1968) included 10

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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. 14.

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species from Europe and North Africa including one Central Asian species in this subgenus, and Osytshnjuk (1977) treated seven species of European Russia. Dylewska (1987) treated six Middle and North European species and named this subgenus *A. ovatula* group. Schmid-Egger & Scheuchl (1997) reported 10 species from middle Europe.

In eastern Asia Cockerell (1929) described one species from China and Hirashima (1965) recorded one species from Japan, Wu (1982) described two species from Tibet, China. Kim & Kim (1983) and Tadauchi & Lee (1992) treated one species from Korea and Osytshnjuk (1995) reported five species from Russian Far East.

In this paper, we give a revision of East Asian species of this subgenus, and recorded 12 species, including three new species from China. One species, *Andrena similis* Smith is firstly recorded from East Asia. Five species also occur in Europe. Two species, *Andrena lathyri* Alfken and *A. gelriae* Vecht, recorded from Russian Far East by Osytshnjuk (1995) and two species, *A. opercula* Wu and *A. subopercula* Wu described from China by Wu (1982), which we could not examine in the present study are only cited. We will make some comments on the latter two species after examining the type material in near future. The holotypes will be preserved in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China, and the paratypes will be deposited in the above institute and the Entomological Laboratory, Kyushu University, Fukuoka, Japan.

### Subgenus *Taeniandrena* Hedicke

*Taeniandrena* Hedicke, 1933, Mitt. Zool. Mus. Berlin, 19: 219; Lanham, 1949, Univ. California Publ. Ent., 8: 196, 215; LaBerge, 1964, Bull. Univ. Nebraska St. Mus., 4: 306-307; Hirashima, 1965, J. Fac. Agr., Kyushu Univ., 13: 505-506; Warncke, 1968, Mem. Est. Mus. Zool. Univ. Coimbra, (307): 79. Type species. *Melitta ovatula* Kirby, 1802, by original designation.

Diagnosis: Medium-sized bees; facial quadrangle broader than long or quadrate; facial fovea broad; clypeus flattened, irregularly punctate with longitudinal impunctate space, black; process of labrum in female narrowed, emarginate apically, surface with curved rugulae at base; labrum below process sulcate with median cristae; subgenal coronet distinct; genal area broad, rounded; pronotum without humeral angle and ridge; propodeal corbicula moderately developed; three submarginal cells present; tibial spurs normal; metasomal terga punctate with apical hair bands. Male with sterna with complete subapical fimbriae.

**Key to species of the subgenus *Taeniandrena* in eastern Asia****Female**

1. Metasomal terga densely tessellate, impunctate or punctures obscure ..... 2
  - Metasomal terga weakly to densely tessellate, punctures weak to distinct ..... 3
2. Pygidium emarginate apically; hind tibia and tarsi ferruginous, caudal fimbria light brown; process of labrum broad; large species, 15-16 mm ..... *lathyri* Alfken
  - Pygidium not emarginate apically; hind tibia and tarsi brown; caudal fimbria black; process of labrum narrow; smaller species, 10-12 mm ..... *metasequoiae* n. sp.
3. Hind tibia and tarsi black [clypeus with elongate punctures and with obscure impunctate space; caudal fimbria blackish covered with whitish] ..... *ezoensis* Hirashima
  - Hind tibia and tarsi ferruginous or brown ..... 4
4. Hairs on head and thorax reddish yellow to foxy red ..... 5
  - Hairs on head and thorax white to dull yellow ..... 6
5. Mesoscutum smooth and shiny posteromedially; hind trochanter brown; process of labrum broad; metasomal sterna black ..... *xuanzangi* n. sp.
  - Mesoscutum weakly tessellate posteromedially; hind trochanter ferruginous; process of labrum narrow; metasomal sterna reddened basally ..... *callopyrrha* Cockerell
6. Facial fovea dark brown; mesoscutum with long, white hairs; metasomal terga with fine punctures [clypeus densely tessellate with elongate punctures; mesoscutum weakly tessellate postmedially; caudal fimbria dark brown]..... *ovatula* (Kirby)
  - Facial fovea light brown to yellowish brown; mesoscutum with short, white or yellowish hairs; metasomal terga with distinct punctures ..... 7
7. Mesoscutum with yellowish hairs; caudal fimbria whitish red; hind legs ferruginous ..... *gelriae* Vecht
  - Mesoscutum with white hairs; caudal fimbria whitish yellow; hind legs ferruginous including brown partly ..... *wilkella* (Kirby)

**Male**

1. Metasomal terga densely tessellate, impunctate or punctures obscure ..... 2
  - Metasomal terga weakly to densely tessellate, punctures weak to distinct ..... 3
2. Flagellar segment 1 longer than 2; head and thorax not mixed with brownish hairs; clypeus weakly tessellate with indistinct punctures, without median impunctate line; mesoscutum with indistinct punctures; propodeal enclosure with rugose at basal 1/4; large species, 11-12 mm ..... *lathyri* Alfken
  - Flagellar segment 1 shorter than 2; head and thorax mixed with brownish hairs; clypeus smooth and shiny with distinct punctures, with narrow median shiny impunctate line; mesoscutum with weak punctures; propodeal enclosure with rugose at basal 2/3

- or more; smaller species, 8-9 mm ..... *metasequoiae* n. sp.
3. Flagellar segment 1 longer than 2 ..... 4  
 - Flagellar segment 1 shorter than or as long as 2 ..... 6
4. Clypeus densely tessellate with tessellate median impunctate space .....  
 ..... *similis* Smith  
 - Clypeus smooth and shiny with median impunctate space ..... 5
5. Clypeus flat with narrow median impunctate space; mesoscutum densely tessellate posteromedially; metasomal terga with apical hair bands, T2-4 complete; hind tibia and tarsi ferruginous; flagellar segments beneath black..... *xuanzangi* n. sp.  
 - Clypeus slightly convex without median impunctate space; mesoscutum weakly tessellate posteromedially; metasomal terga with apical hair bands, T4 complete or interrupted; hind femur, tibia and tarsi ferruginous; flagellar segments beneath brown .....  
 ..... *callopyrrha* Cockerell
6. Flagellar segment 1 as long as 2 [clypeus slightly convex and weakly tessellate and shiny with narrow impunctate line; metasomal terga with apical hair bands, T3-4 complete] ..... *ovatula* (Kirby)  
 - Flagellar segment 1 shorter than 2 ..... 7
7. Metasomal terga with apical hair bands, T3-4 complete ..... 8  
 - Metasomal terga with apical hair bands, T4 complete ..... 9
8. Mesoscutum weakly tessellate and shiny posteromedially; hairs on head and thorax white; hind tibia and tarsi black..... *ezoensis* Hirashima  
 - Mesoscutum densely tessellate posteromedially; hairs on head and thorax pale yellow; hind tibia apically and tarsi reddened ..... *steini* n. sp.
9. Mesoscutum weakly tessellate posteromedially; hairs on head and thorax white; hind tibia and tarsi black ..... *wilkella* (Kirby)  
 - Mesoscutum densely tessellate posteromedially; hairs on head and thorax yellow; hind tibia apically and tarsi reddened ..... *gelriae* Vecht

### 1. *Andrena (Taeniandrena) lathyri* Alfken

*Andrena lathyri* Alfken, 1899, Ent. Nachr., 25: 103 [female & male, Germany];  
 Stöckhert, 1930, in Hymenop. Nord-und Mitteleuropas, 935, 979 [female & male, in key].

*Andrena (Taeniandrena) lathyri*: Niemelä, 1949, Ann. ent. Fenn. Helsinki, 15 (3): 105-106 [female & male, Finland]; Osytshnjuk, 1977, Faun. Ukraini, 12(5): 197-198; Osytshnjuk, 1995, Key Insects Russian Far East, Vol. IV, Part 1, 505, 523 [female

& male, in key, Russian Far East]; Schmid-Egger & Scheuchl, 1997, III. Bestim. Wildbienen Deuts. und Öster. III: Andrenidae: 38, 87, 121, 146 [female & male, in key].

*Redescription:* See Osytshnjuk (1977).

*Specimens examined:* Not available in this study from East Asia. Reference material: SWEDEN: 1 female, Bh. Ytterby, 7. vi. 1951 (L. Rytterfalk); 1 male, Stockholm, 10. vi. 1949 (S. Erlandsson) (both determined by Erlandsson).

*Remarks:* Although we could not examine material collected from East Asia, Osytshnjuk (1995) recorded this species from Russian Far East. It is similar to *Andrena metasequoiae* n. sp. in having the metasomal terga nearly impunctate. But the female of this species is recognized by the pygidium emarginate apically, the legs ferruginous, the caudal fimbria light brown, the process of labrum broader and the larger size. The male of this species is recognized by the clypeus weakly tessellate with indistinct punctures and without median impunctate line, the FL1 longer than FL2 which is as long as FL3, the mesoscutum densely tessellate with indistinct punctures, the propodeal enclosure with rugose at basal 1/4, and the hairs on the head and thorax without brown hairs.

*Distribution:* Russia (Far East Area, European Russia); middle to north Europe.

*Floral association:* Not available in East Asia.

*Flight records:* Not available in East Asia.

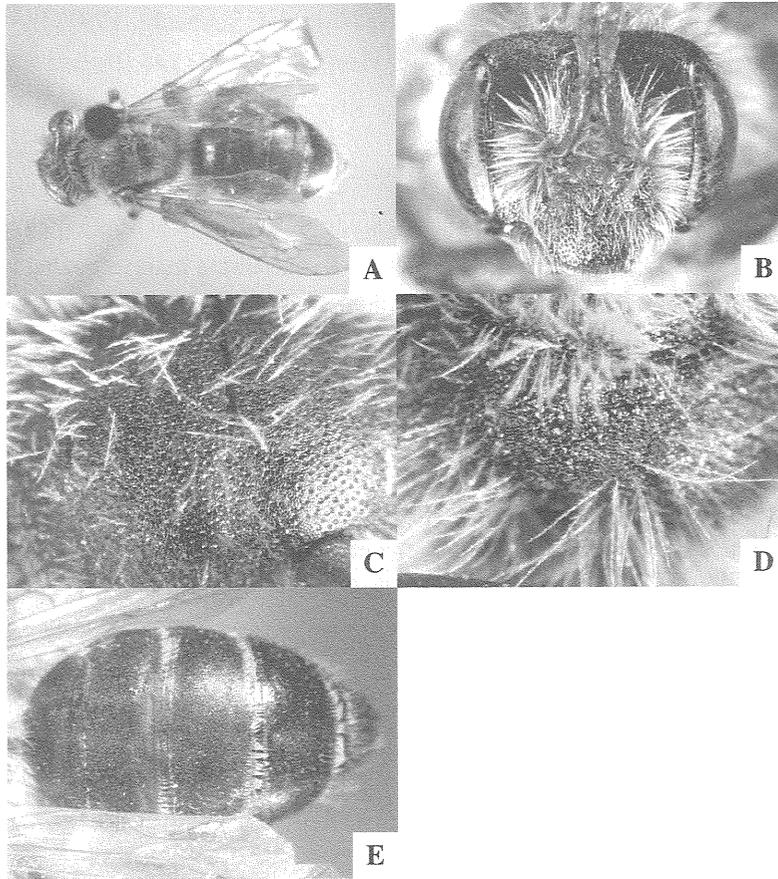
## 2. *Andrena (Taeniandrena) metasequoiae* n. sp.

(Figs. 1: A-E, 2: A-E, 3: A-E)

**Female:** BL 10.0-12.2 mm, WL 7.5-8.7 mm (n = 5).

*Color:* Flagellum reddish brown beneath; mandible with apical third or more reddened; wing membranes subhyaline, moderately brown, veins and pterostigma reddish brown; hind tibia except basal area and basitarsi reddish brown, tibial spurs yellowish; posterior depressions of metasomal terga reddish brown.

*Pubescence:* Hairs on head sparse, dull white to pale yellow mixed with brown; those on clypeus 200 $\mu$ ; those on antennal area long and dense; those on vertex 300-600 $\mu$ , light brown; facial fovea brown. Hairs on thorax dense, pale yellow; those on mesoscutum 200-400 $\mu$ , mixed with brown medially; those on scutellum and metanotum dull whitish; those on mesepisternum 500 $\mu$ , paler; propodeal corbicula moderately developed, with internal sparse simple hairs; trochanteral floccus perfect, whitish; femoral floccus dense; tibial scopal hairs long, simple, yellow. Hairs on metasomal terga scanty, terga 2-4 with very short brownish hairs, terga 2-4 with short whitish hair



**Fig. 1:** A-E: *Andrena (Taeniandrena) metasequoiae* n. sp., female. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

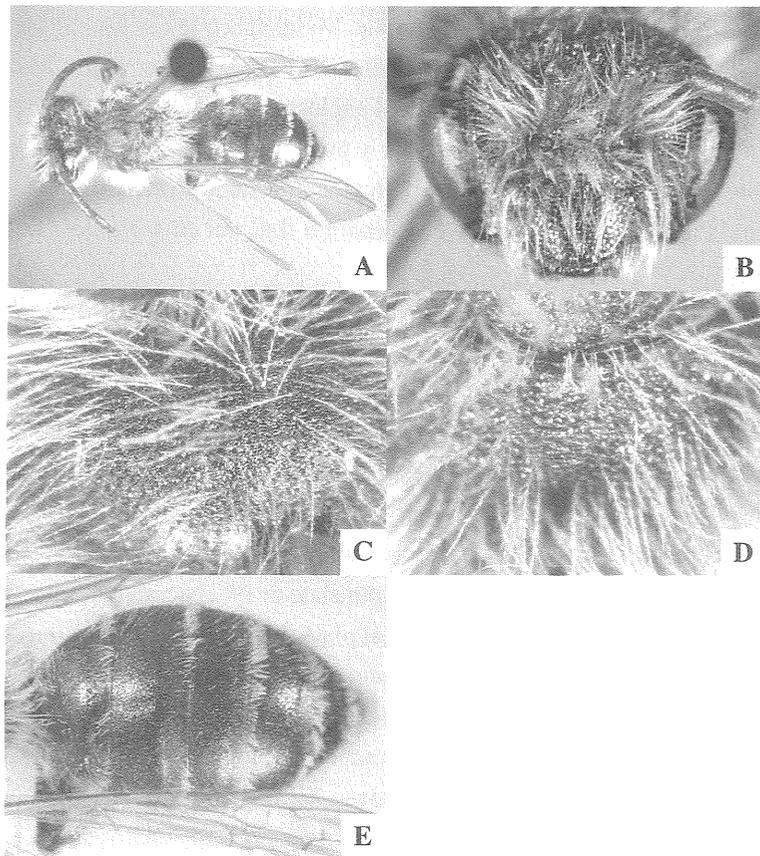
bands, interrupted on terga 2-3, rarely complete on tergum 3; caudal fimbria brown; sterna 2-5 with long, sparse yellowish subapical fimbriae.

*Structure: Head:* HL/HW = 0.82. HW: MsW: MtW = 3.3: 3.0: 3.2. Vertex shagreened with roughened PP. OOD: POD: OCD = 0.7: 0.4: 0.3. FL1 = FL2+3, FL2 = FL3 which are as broad as long, intermediate segments as broad as long. Eyes with inner margins subparallel. Facial fovea broad, narrowing toward below, extending below to a line at lower margin of antennal fossae, FVL = 1.3 mm, FVW = 0.65 mm. Supraclypeal area and face above antennal fossae with fine longitudinal rugulae and coarse interrugal PP. Facial quadrangle as broad as long (about 2.2: 2.2). Clypeus markedly flattened, densely tessellate, with a narrow median tessellate impunctate line, surface with close PP  $\varnothing 15\mu$ , IS = 0.5-1, CPL = 1.0 mm. Process of labrum small, emarginate apically, surface with weak, curved rugulae. Labrum apical to process with distinct cristae. Lower paraocular area weakly tessellate and crowdedly punctate. Malar space linear.

Genal area broader than eye, GW: EW = 1.1: 0.8, surface finely tessellate, narrowly shiny with obscure minute PP. *Mesosoma*: Pronotum densely tessellate with obscure PP. Mesoscutum shagreened anteriorly, densely tessellate posteromedially, surface with PP  $\phi 10\mu$ , IS = 1. Scutellum weakly tessellate, broadly shiny medially with PP  $\phi 10\mu$ , IS < 1. Propodeal enclosure well defined, strongly rugose at basal half, shagreened apically; dorsal face of propodeum dulled by coarse punctation. Mesepisternum densely tessellate, dulled medially. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. *Metasoma*: Metasomal terga densely tessellate, nearly impunctate; posterior depressions of terga not well indicated; pygidial plate V-shaped, with distinctly raised internal triangular area. Sterna 2-5 finely tessellate, broadly impunctate basally, closely punctate apically.

**Male:** BL 8.0-9.5 mm, WL 6.8-8.1 mm (n=2).

**Color:** Flagellum chocolate beneath; mandible with apical third reddened; wing



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

membranes subhyaline, moderately brown, veins and pterostigma reddish brown; legs black; tibial spurs yellowish; posterior depressions of metasomal terga reddish brown.

*Pubescence:* Hairs on head and thorax as in female, but longer, dull yellowish mixed with brown on vertex and mesoscutum. Hairs on metasomal terga short and sparse, yellow to brown; those on terga 1-2 yellow; those on terga 3-5 brown; terga 1-5 with dull white hair bands, interrupted on terga 1-3; sterna 2-5 with well-formed dull white subapical fimbriae.

*Structure: Head:* HL/HW = 0.82. HW: MsW: MtW = 2.7: 2.5: 2.5. Vertex roughened by coarse minute PP. OOD: POD: OCD = 0.6: 0.3: 0.2. FL1 < FL2, FL2 = FL3 which are longer than broad. Eyes with inner margins subparallel. Supraclypeal area and face above antennal fossae sculptured as in female. Facial quadrangle quadrate (about 1.8: 1.8). Clypeus flattened, smooth and shiny, surface with deep, crowded PP  $\phi$ 20-40 $\mu$ , IS < 0.5, with an obscure median impunctate line, CPL = 0.8 mm. Process of labrum small, deeply emarginate apically, surface smooth and shiny. Mandibles decussate. Lower paraocular area as in female. Malar space linear. Genal area as broad as eye, GW: EW = 0.7: 0.7, surface broadly shagreened. *Mesosoma:* Mesoscutum densely tessellate with weak PP. Propodeal enclosure rugose at basal 2/3. *Metasoma:* Metasomal terga densely tessellate, minutely punctate on terga 2-5, PP with IS = 1-2; posterior depressions of terga not well indicated. Sterna 2-5 finely tessellate, weakly shiny, weakly punctate as in terga 2-5; sternum 6 flat, not emarginate. Genitalia and associated structures illustrated in Fig. 3: A-E.

*Type material:* Holotype female: Caike, 3,000 m, Xiangcheng County, Sichuan Province, 21. vi. 1982 (S-y. Wang); Paratypes: CHINA: Sichuan Province: 2 males, same data as the holotype. Yunnan Province: Lude, Yongshen County: 1 female, 2,250 m, 8. vii. 1984 (J-g. Fan), 1 female, 2,400 m, 10. vii. 1984 (J-g. Fan). Xizang Autn. Region: 2 females, Molinpai, 3,000 m, Motuo County, 20. vii. 1983 (Y-h. Han).

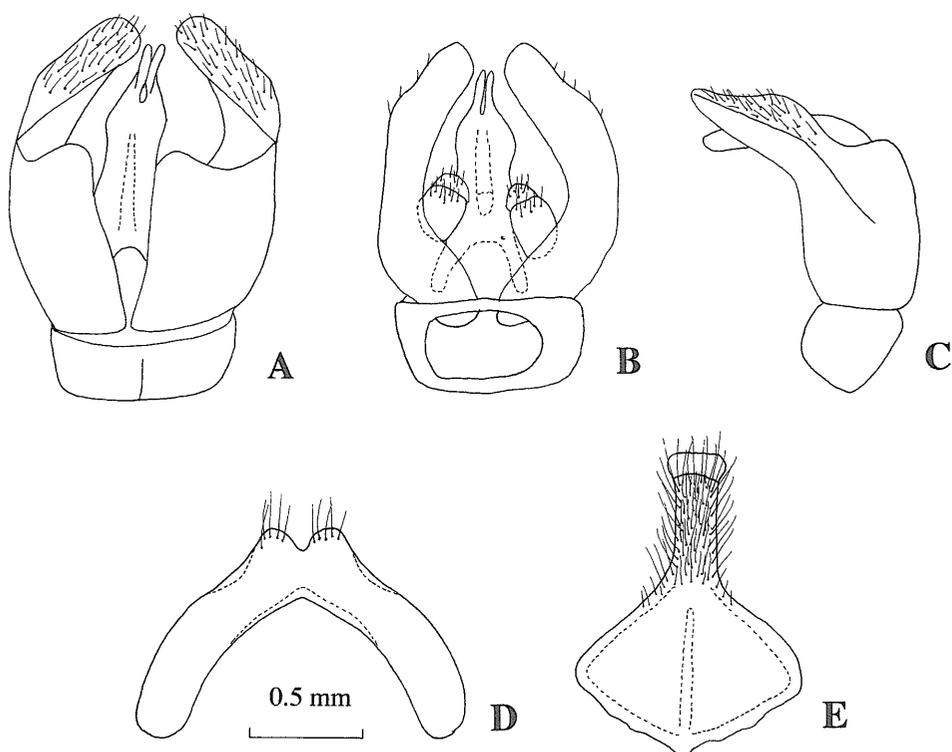
*Remarks:* This species is similar to *Andrena lathyri* Alfken in female in having the metasomal terga densely tessellate and nearly impunctate or PP obscured. The female can be separated from that of *lathyri* by the pygidial plate not emarginate apically, the caudal fimbria brown and the smaller size. The male of this species is separated from that of *lathyri* by the FL1 shorter than FL2, the clypeus with distinct larger PP and a narrow median impunctate line, and the propodeal enclosure rugose basal 2/3 to all over.

*Distribution:* China (Sichuan, Yunnan Provs., Xizang Autn. Region).

*Floral association:* *Lithospermum erythrorhizon*.

*Flight records:* Female: late June to mid July; male: late June.

*Etymology:* The specific name is derived from a famous living fossil plant, *Metasequoia glyptostroboides* which was found from the type locality, Sichuan Province in



**Fig. 3: A-E:** *Andrena (Taeniandrena) metasequoiae* n. sp., male. A. 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.

1941.

### 3. *Andrena (Taeniandrena) ezoensis* Hirashima

*Andrena (Taeniandrena) ezoensis* Hirashima, 1965, J. Fac. Agr., Kyushu Univ., 13: 506-509 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 108, 119 [female & male, in key]; Kim & Kim, 1983, Ent. Res. Bull., 9: 71 [Korea]; Tadauchi & Lee, 1992, Esakia, (32): 54 [Korea]; Osytshnjuk, 1995, Key Insects Russian Far East, Vol. IV, Part 1, 507-508, 523 [female & male, in key, Russian Far East].

*Description.* See Hirashima (1965).

*Photos.* See Tadauchi *et al.* (2001): <http://konchudb.agr.agr.kyushu-u.ac.jp/hanabachi/>  
*Specimens examined:* Holotype male and allotype female (Kyushu Univ.),

Ikeda, Tokachi, Hokkaido, Japan, 14-16. vii. 1953 (Y. Hirashima). Other material: JAPAN: 3 females, Kaidamura, Nagano Pref., 22. vii. 1970 (K. Kanmiya); 1 female, Shiga-kogen, Nagano Pref., 16. vii. 1972 (Y. Yoshiyasu). KOREA: 3 females and 2 males, Yonsil, Mt. Hallasan, Cheju Is., 24. vii. 1990 (O. Tadauchi). CHINA: Beijing: 1 female, Donglingshan, 1,100 m, 29. viii. 1991 (L-l. Yang); Xiaolongmen: 1 female, 28. vii. 1991 (Y-s. Shi); 2 females, 28. vii. 1995 (H-l. Xu). Hebei Province: 1 female, Xiaowutaishan, 1,200-1,400 m, 23. viii. 1964 (C-g. Wang); 1 female, Guangtushan, 1,500-1,750 m, Pingquan County, 30. vii. 1985 (X-z. Zhang). Jilin Province: Baihe, Changbaishan, 1 male, 26. vii. 1981 (S-f. Wang); 1 female, 1. viii. 1981 (Y-r. Wu); 2 males, 2. viii. 1981 (Y-r. Wu); 2 males, 30. viii. 1981 (Y-r. Wu); 1 male, 7. viii. 1981 (S-f. Wang); 1 male, 6. viii. 1981 (Y-r. Wu); 1 female, 7. viii. 1981 (Y-r. Wu); 2 females, 25-28. vii. 1986 (X-l. Meng).

*Remarks:* The female of this species is recognized by the legs black, the clypeus with elongate punctures, the facial fovea light brown, the mesoscutum densely tessellate all over and the caudal fimbria blackish. The male of this species is recognized by the legs black, the FL1 is shorter than FL2 which is about as long as FL3, the metasomal terga weakly tessellate and shiny with distinct punctures.

*Distribution:* China (new record, Beijing, Hebei, Jilin Provs.); Japan (Hokkaido, Honshu); Korea (central Korea, Cheju Is.); Russia (Far East area).

*Floral association:* Japan: *Trifolium repens*, *Dasyphora fruticosa*; China: *Vicia unijuga*, *Lespedeza bicolor*.

*Flight records:* Female: Japan: mid July to late August, China: late July to late August; male: Japan: late June to mid July, China: late July to late August.

#### 4. *Andrena (Taeniandrena) xuanzangi* n. sp.

(Figs. 4: A-E, 5: A-E, 6: A-E)

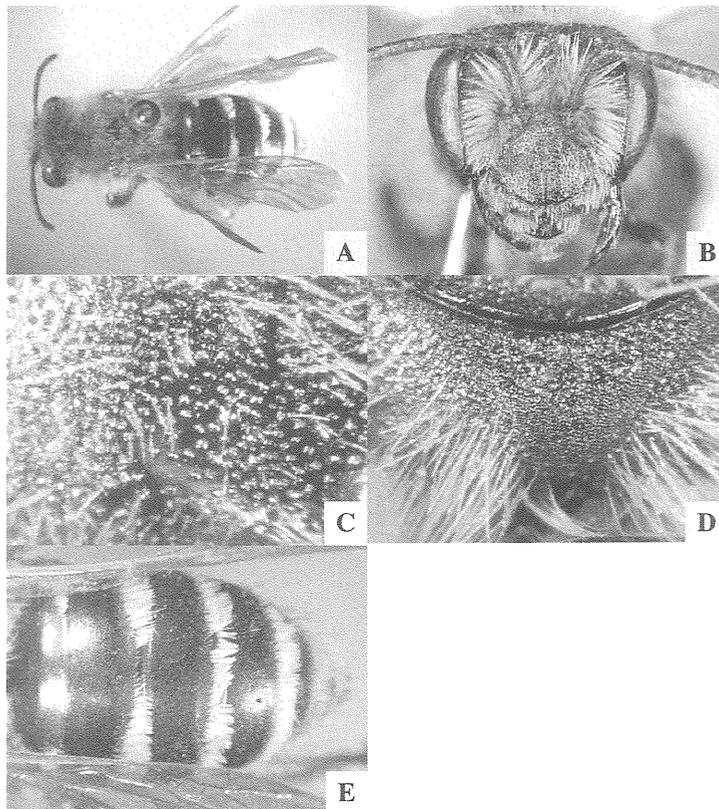
**Female:** BL 10.0-12.2 mm, WL 8.5-9.2 mm (n= 6).

*Color:* Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes subhyaline, moderately brown, veins and pterostigma reddish brown; hind femur partly, tibia and basitarsi ferruginous; tibial spurs reddish yellow; posterior depressions of metasomal terga reddish brown.

*Pubescence:* Hairs on head and thorax dense, reddish yellow; those on clypeus naked broadly; those on antennal area long and dense; those on vertex 400-600 $\mu$ ; facial fovea yellowish brown. Hairs on mesoscutum and scutellum 200-300 $\mu$ ; those on mesepisternum 500-700 $\mu$ , yellowish; propodeal corbicula with dorsal fringes not well arranged, with internal long, simple hairs; trochanteral floccus perfect, yellow; femoral floccus dense; tibial scopal hairs long, simple, yellow. Hairs on metasomal terga

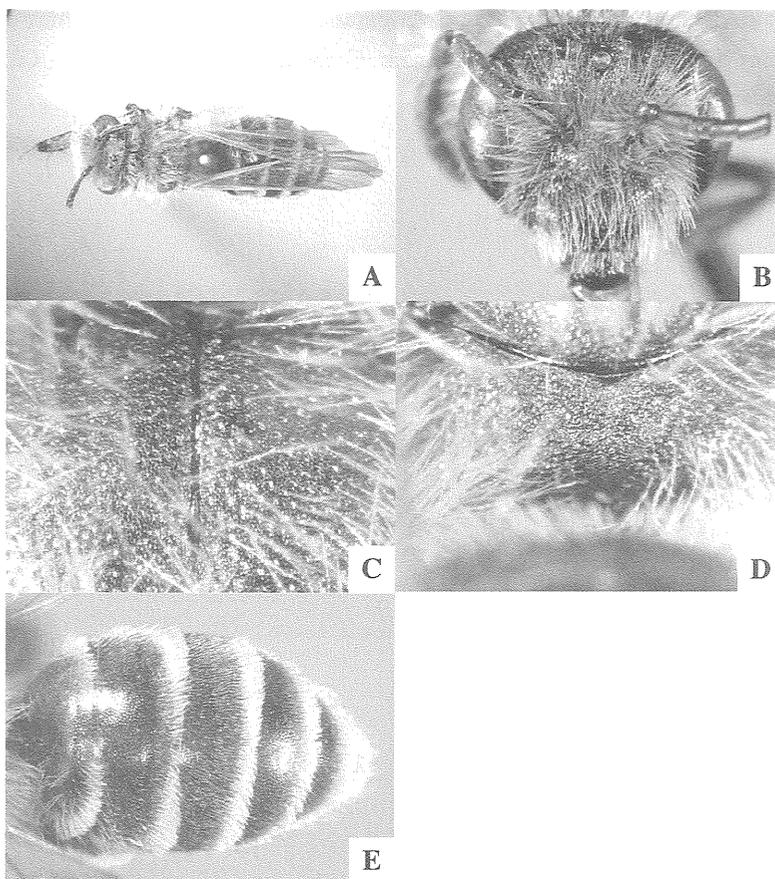
sparse; tergum 1 with lateral apical fringes; terga 2-4 with dense, yellowish hair bands, tergum 2 interrupted, terga 3-4 complete; caudal fimbria golden yellow; sterna 2-5 with long, sparse fulvous subapical fimbriae.

*Structure: Head:* HL/HW = 0.85. HW: MsW: MtW = 3.6: 3.3: 3.5. Vertex smooth and shiny with small PP. OOD: POD: OCD = 0.8: 0.5: 0.3. FL1 = FL2+3, FL2 = FL3 which are about as broad as long, intermediate segments as broad as long. Eyes with inner margins subparallel. Facial fovea broad, extending to below a line at lower margin of antennal fossae, FVL = 1.4 mm, FVW = 0.65 mm. Supraclypeal area and face above antennal fossae with weak longitudinal and coarse interrugal PP. Facial quadrangle broader than long (about 2.6: 2.4). Clypeus markedly flattened, weakly granulate, with a narrow median tessellate impunctate space, surface with fine PP  $\phi$ 15-20 $\mu$ , IS = 1-2 laterally, closer near median line, CPL = 1.1 mm. Process of labrum large and broad, emarginate apically, surface with weak curved rugulae at base. Labrum apical to process with distinct median cristae. Lower paraocular area smooth and shiny crowdedly punctate with PP  $\phi$ 20 $\mu$ . Malar space linear. Genal area broader than eye, GW: EW =



**Fig. 4:** A-E: *Andrena (Taeniandrena) xuanzangi* n. sp., female. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

1.2: 0.8, surface weakly tessellate posteriorly, narrowly shiny with linear minute PP near eye. *Mesosoma*: Pronotum weakly tessellate with obscure PP. Mesoscutum densely tessellate anteriorly, smooth and shiny posteromedially, with  $PP\varnothing 20\mu$ , IS = 1-3. Scutellum smooth and shiny with  $PP\varnothing 20\mu$ , sparser medially, denser laterally. Propodeal enclosure slightly irregularly rugulose at basal half, finely granulate at apical half; dorsal face of propodeum densely tessellate with roughened PP. Mesepisternum sculptured as in dorsal face of propodeum, dulled medially. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. *Metasoma*: Metasomal terga elliptic, surface finely tessellate and minutely punctate; tergum 1 with apical area with obscure minute PP; terga 2-4 each with basal area with distinct minute PP, IS = 1-2, apical area with sparse PP; posterior depressions of terga not well indicated; pygidial plate V-shaped, with weak internal raised area. Sterna 2-5 finely tessellate and narrowly impunctate basally, closely



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

punctate apically as basal areas of terga 2-4.

**Male:** BL 8.0-9.0 mm, WL 7.6-7.7 mm (n=3).

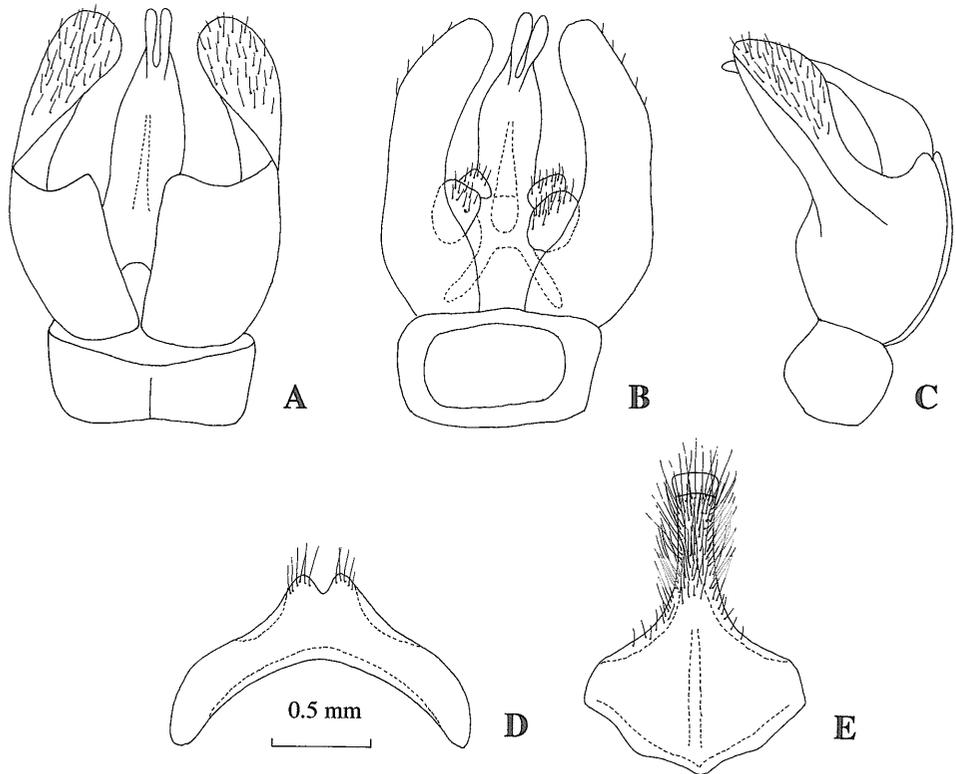
**Color:** Flagellum black beneath; mandible, wing, legs and posterior depressions of metasomal terga as in female.

**Pubescence:** Hairs on head and thorax dense, reddish yellow to yellow; those on clypeus 400-500 $\mu$ ; those on vertex 500-650 $\mu$ ; those on mesoscutum and scutellum 500 $\mu$ ; those on mesepisternum long, yellow; legs with yellow hairs. Hairs on metasomal terga 1-2 slightly long laterally; terga 1-5 with dense yellow hair bands, interrupted on terga 1-2, complete on terga 3-5; sterna 2-5 with short, well-formed white or yellow subapical fimbriae.

**Structure: Head:** HL/HW = 0.85. HW: MsW: MtW = 3.3: 2.7: 3.0. Vertex roughened by coarse minute PP. OOD: POD: OCD = 0.7: 0.4: 0.3. Flagellar segments long, FL1 > FL2, FL2=FL3. Eyes with inner margins subparallel. Supraclypeal area and face above antennal fossae sculptured as in female. Facial quadrangle quadrate (about 2.3: 2.3). Clypeus flattened, weakly tessellate basally, smooth and shiny apically, surface with deep crowded PP  $\phi$  20-40 $\mu$ , IS < 0.5, with an obscure median impunctate line, CPL = 1.0 mm. Process of labrum large, deeply emarginate apically, surface smooth and shiny. Mandibles decussate. Lower paraocular area shiny with close PP. Malar space linear. Genal area broader than eye, GW: EW = 1.0: 0.7, surface weakly tessellate, weakly shiny with obscure PP. **Mesosoma:** Pronotum, mesoscutum and scutellum with forms and sculpturing as in female, but PP smaller; propodeal enclosure weakly rugulose basally, tessellate apically; dorsal face of propodeum and mesepisternum roughened by coarse punctation. Wing venation as in female. **Metasoma:** Metasomal terga weakly tessellate and shiny, surface with weak, shallow minute PP, IS = 1 on terga 1-2, closer on terga 3-5; posterior depressions of terga not well indicated. Sterna 2-5 finely tessellate with fine PP, IS = 1-2 apically; sternum 6 flat, not emarginate. Genitalia and associated structures illustrated in Fig. 6: A-E.

**Type material:** Holotype female: Balikun, 2,300 m, Xinjiang Uygur Autn. Region, China, 9. vi. 1979 (S-f. Wang); Paratypes: CHINA: Same data as the holotype: 2 females and 1 male; same locality as the holotype: 1 female, 8. vi. 1979 (S-f. Wang); 1 male, 9. vi. 1979 (J-p. Liu); 1 female, 11. vi. 1979 (J-p. Liu).

**Remarks:** This species is similar to *Andrena callopyrrha* Cockerell in having the hairs on the head and thorax reddish yellow. The female can be separated from that of *callopyrrha* by the mesoscutum smooth and shiny medially, the process of labrum broader and the propodeal enclosure with rugose weaker at basal half. The male is separable from that of *callopyrrha* by the clypeus flattened with a narrow median impunctate line, the yellow hair fringes of metasomal terga well developed, T2-4



**Fig. 6: A-E:** *Andrena (Taeniandrena) xuanzangi* n. sp., male. A. 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.

complete and the antennae beneath black.

*Distribution:* China (Xinjiang Uygur Autn. Region).

*Floral association:* *Astragalus* sp.

*Flight records:* Female: early to mid June; male: early June.

*Etymology:* The specific name is dedicated to Chinese Buddhist priest Xuanzang (Genjo or Sanzo-Hoshi in Japanese) who traveled with hardships from Changan (Xian at present) to India through Xinjiang Uygur on Silk Road in 629 B.C. in the Tang Dynasty and returned with many Buddhist Scriptures in 645 B.C. and translated them into Chinese which were imparted to Japan later.

**5. *Andrena (Taeniandrena) callopyrrha* Cockerell**

(Figs. 7: A-E, 8: A-E)

*Andrena callopyrrha* Cockerell, 1929, Entomologist, 62: 205-206 [female, China]; Cockerell, 1931, Amer. Mus. Nov., (452): 3 [male, China]; Yasumatsu, 1941, Peking nat. Hist. Bull., 15: 274 [in list].

*Andrena (Taeniandrena) callopyrrha*: Xu & Tadauchi, 1997, Esakia, (37): 181-183 [redescription]; Gusenleitner & Schwarz, 2001, Entomofauna, 22: 283.

*Redescription.*

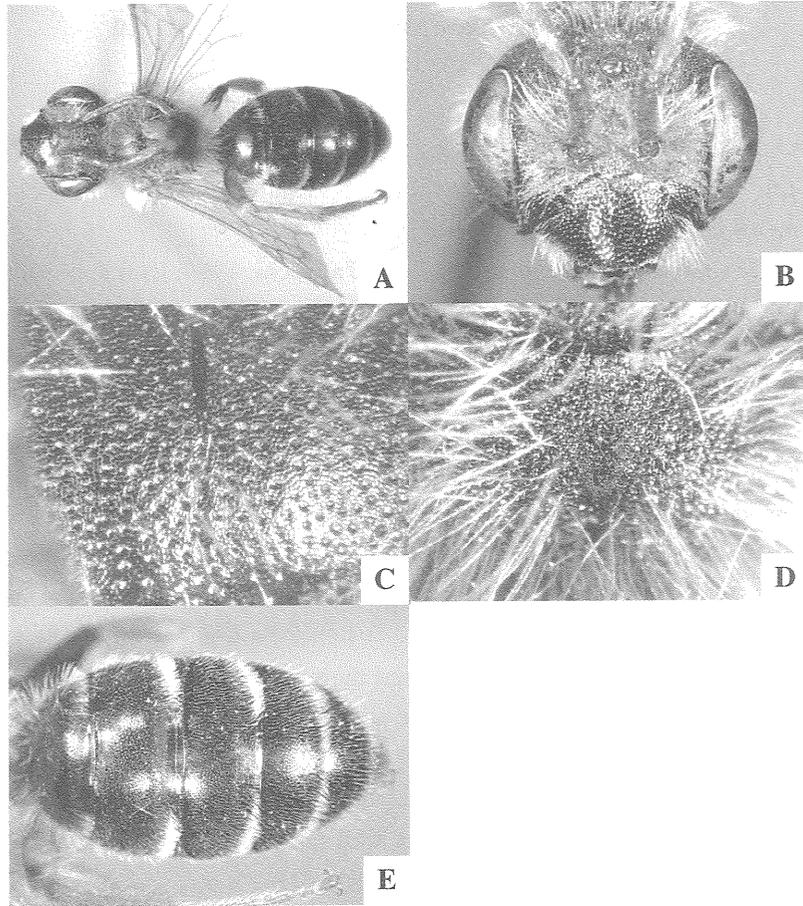
**Female:** See Xu & Tadauchi (1997) with photos.

**Male:** BL 8.5-9.0 mm, WL 7.0-7.2 mm (n=2).

**Color:** Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes subhyaline, moderately brown, veins and pterostigma yellowish brown; hind femur mostly, tibia and basitarsi ferruginous; tibial spurs yellow; posterior depressions of metasomal terga reddish brown.

**Pubescence:** Hairs on head moderate and thorax dense, yellow; those on clypeus 350-450 $\mu$ ; those on vertex 500-600 $\mu$ ; those on mesoscutum and scutellum 500 $\mu$ ; those on mesepisternum long, yellow; legs with yellow hairs. Hairs on metasomal terga 1-2 slightly long laterally; terga 1-5 with dense white hair bands, interrupted on terga 1-3, complete on terga 4-5; sterna 2-5 with short, well-formed yellow subapical fimbriae.

**Structure: Head:** HL/HW = 0.85. HW: MsW: MtW = 2.9: 2.6: 2.7. Vertex smooth and shiny with small PP. OOD: POD: OCD = 0.9: 0.7: 0.5. Flagellar segments long, FL1 > FL2, FL2 < FL3. Eyes with inner margins subparallel. Supraclypeal area and face above antennal fossae with fine longitudinal rugulae and coarse interrugal PP. Facial quadrangle quadrate (about 2.9: 3.0). Clypeus convex, smooth and shiny, surface with weak PP  $\varnothing$  20-40 $\mu$ , IS < 0.5, with an obscure median impunctate line, CPL = 0.9 mm. Process of labrum small, deeply emarginate apically, surface smooth and shiny. Mandibles decussate. Lower paraocular area smooth and shiny with close PP. Malar space linear. Genal area narrower than eye, GW: EW = 1.5: 1.8, surface weakly tessellate, weakly shiny with obscure PP near eye. **Mesosoma:** Mesoscutum weakly tessellate anteriorly, very weakly tessellate and shiny medioapically with weak PP. Propodeal enclosure weakly rugulose at basal 1/2, tessellate at apical 1/2; dorsal face of propodeum and mesepisternum roughened by coarse punctation. **Metasoma:** Metasomal terga weakly tessellate and shiny, surface with weak, shallow minute PP, IS = 1 on terga 1-2, closer on terga 3-5; posterior depressions of terga not well indicated. Sterna 2-5 finely tessellate with fine PP, IS = 1-2 apically; sternum 6 flat, not emarginate. Genitalia and associated structures illustrated in Fig. 8: A-E.



**Fig. 7: A-E:** *Andrena (Taeniandrena) callopyrrha* Cockerell, male. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

*Specimens examined:* Holotype female (Type No. 55316, USNM), Tsinan (now is Jinan, Shandong Prov.). Other material: CHINA: Jiangsu Province: Nanjing: 1 female, 15. iv. 1918; 1 female, 13. iv. 1926. Beijing: 1 female, 9. iv. 1936; 1 female, Xiangshan, 27. iv. 1973; 1 female, 26. iv. 1974 (Y-r. Wu); 2 males, 4. v. 1964 (S-m. Ge). Inner Mongol Autn. Region: 2 females, Apaka, 1-10. vi. 1939 (K. Tsuneki). Shannxi Province: 1 female, 1. vi. 1963 (J-l. Mao); 1 female, Huangling, 1,000-1,400m, 4. vi. 1963 (J-l. Mao) MONGOLIA: 1 female, Archangaj aimak, Changaj Gebirge 8 km W von Somon Urdtamir, 1,620m, 19. vi. 1966 (Exp. of Z. Kaszab); 1 female, Central aimak, 11 km S von Pass Zosijn davaa, 90 km S von UlanBaator, 1,650m, 7. v. 1967 (Exp. of Z. Kaszab).

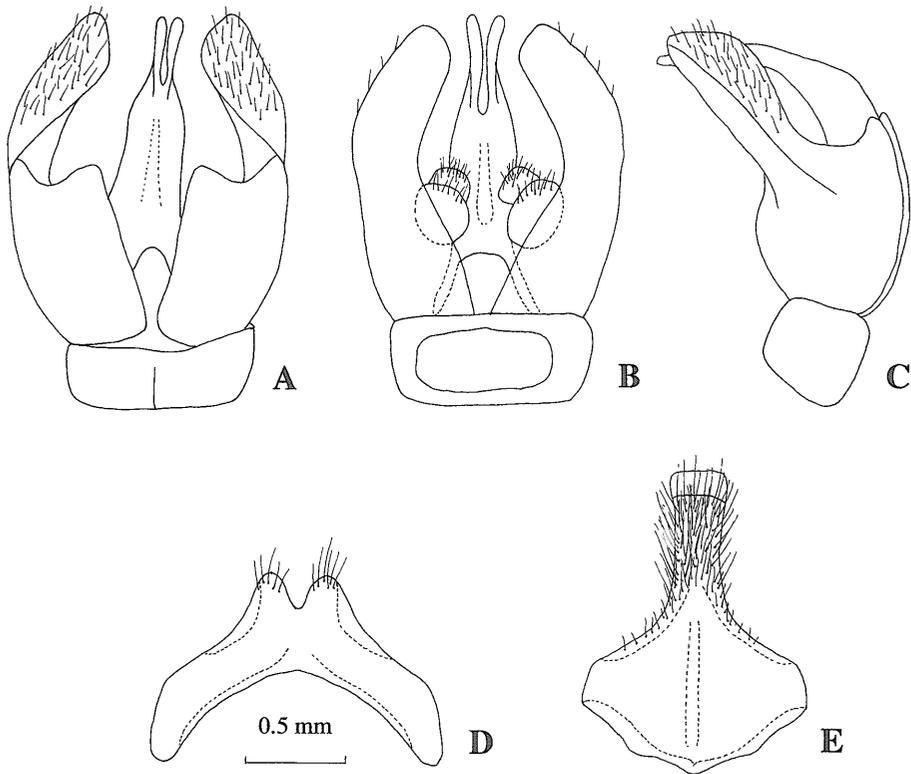
*Remarks:* The female of this species is similar to *Andrena xuanzangi* n. sp. in having the head and thorax with reddish yellow hairs, but can be separated by the mesoscutum

weakly tessellate medially, the propodeal enclosure with rugose stronger at basal half, the tibia and tarsi ferruginous in all legs including hind trochanter, and the process of labrum narrower. The male is recognized by the clypeus slightly convex without median impunctate line, the legs with tibia and tarsi ferruginous in all legs, the metasomal terga with apical fringes not well developed, terga 1-3 interrupted.

*Distribution:* China (Beijing, Shandong, Jiangsu, Shannxi Provs., Inner Mongol Autn. Region), Mongolia (new record).

*Floral association:* One female was collected on *Onobrychis viciaefolia*.

*Flight records:* Female: early April to mid June, male: early May.



**Fig. 8: A-E:** *Andrena (Taeniandrena) callopyrrha* Cockerell, male. A. 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.

### 6. *Andrena (Taeniandrena) similis* Smith

(Figs. 9: A-E)

*Andrena similis* Smith, 1849, Zoologist, 66: 60 [female, England]; Stöckhert, 1930, in: Schmiedeknecht, Hymenop. Nord-und Mitteleuropas: 935, 985 [female & male, in key].

*Andrena (Taeniandrena) similis*: Niemelä, 1949, Ann. Ent. Fenn., 15 (3): 116-117 [female & male, Finland]; Osytshnjuk, 1977, Faun.Ukraini, 12(5): 194-195; Schmid-Egger & Scheuchl, 1997, Ill. Bestim. Wildbienen Deuts. und Öster. III: Andrenidae: 89, 136 [female & male, in key].

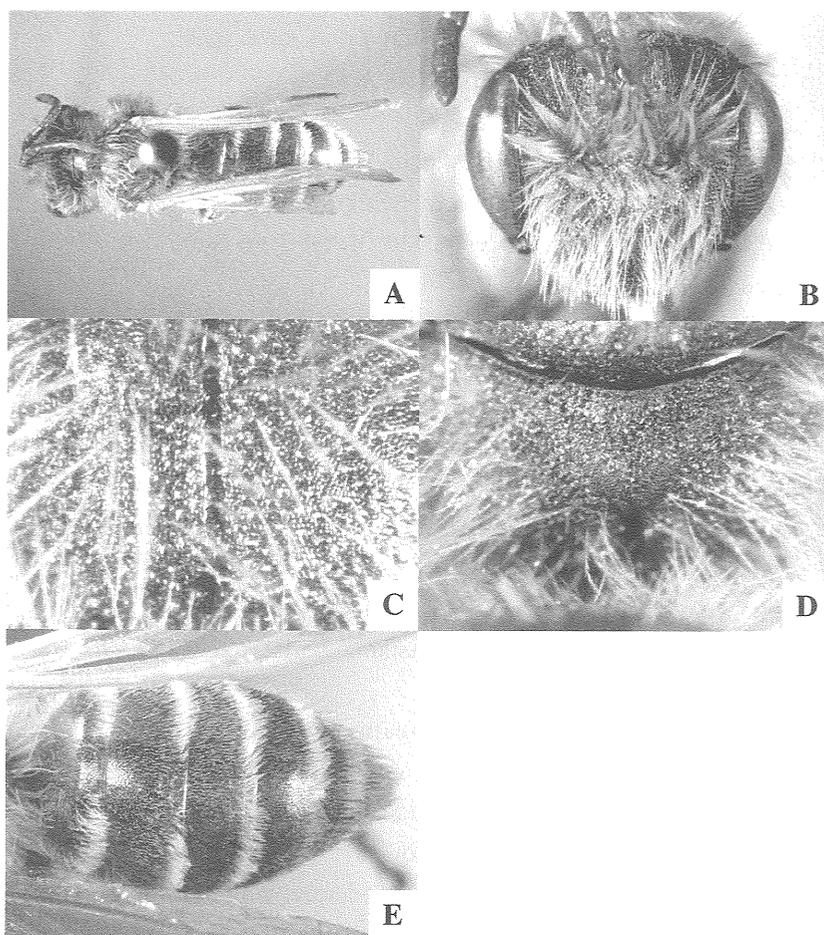
*Redescription*: See Osytshnjuk (1977).

**Male** (redescription based on East Asian material): BL 9.5 mm, WL 9.0 mm (n=1).

**Color**: Flagellum reddish brown beneath; mandible with apical third reddened; wing membranes subhyaline, moderately brown, veins and pterostigma yellowish brown; hind tibia and basitarsi ferruginous; tibial spurs reddish yellow; posterior depressions of metasomal terga reddish brown; sternum 6 broadly reddened apically.

**Pubescence**: Hairs on head and thorax dense, reddish yellow; those on clypeus 500-600 $\mu$ ; those on vertex 500-650 $\mu$ ; those on mesoscutum and scutellum 400-500 $\mu$ ; those on mesepisternum long; legs with reddish yellow hairs. Hairs on metasomal terga 1-2 slightly long laterally; terga 1-5 with dense white hair bands, interrupted on terga 1-2, complete on terga 3-5; sterna 2-5 with short, well-formed yellow subapical fimbriae.

**Structure**: *Head*: HL/HW = 0.84. HW: MsW: MtW = 3.2: 3.0: 2.7. Vertex densely tessellate with roughened PP. OOD: POD: OCD = 1.4: 0.9: 0.7. Flagellar segments long, FL1 > FL2, FL2 < FL3. Eyes with inner margins subparallelled. Supraclypeal area and face above antennal fossae with fine longitudinal rugulae and coarse inter-rugal PP. Facial quadrangle quadrate (about 2.2: 2.2). Clypeus flattened, densely tessellate, surface with close deep PP  $\approx$  20-40 $\mu$ , IS < 0.5, with a tessellate median impunctate line, CPL = 1.0 mm. Process of labrum small, deeply emarginate apically, surface smooth and shiny. Mandibles decussate. Lower paraocular area weakly tessellate with close PP. Malar space linear. Genal area as broad as eye, GW: EW = 1.2: 1.2, surface weakly tessellate, weakly shiny with obscure PP near eye. *Mesosoma*: Mesoscutum densely tessellate anteriorly, weakly tessellate medioapically with weak PP. Propodeal enclosure weakly rugulose at basal 1/2, tessellate at apical 1/2; dorsal face of propodeum and mesepisternum roughened by coarse punctation. *Metasoma*: Metasomal terga densely tessellate, surface with weak, shallow minute PP, IS = 1 on terga 1-2, closer on terga 3-5; posterior depressions of terga not well indicated. Sterna 2-5 finely tessellate with fine PP, IS = 1-2 apically; sternum 6 flat, not emarginate.



**Fig. 9: A-E:** *Andrena (Taeniandrena) similis* Smith, male. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

*Specimens examined:* CHINA: 1 male, Baluntai, Hejing, 2,350m, Xinjiang Uygur Autn. Region, China, 27. v. 1960 (S-y. Wang).

*Remarks:* This is the first record of this species from East Asia. The male of this species is similar to *Andrena xuanzangi* n. sp. in having the head and thorax with reddish yellow hairs and the hind tibia and tarsi ferruginous. But it is recognized by the clypeus densely tessellate with a median impunctate tessellate space, the FL2 longer than FL3, the antennae beneath reddish and the sternum 6 broadly reddened apically.

*Distribution:* China (new record: Xinjiang Uygur Autn. Region), Central Asia, middle to north Europe, European Russia.

*Floral association:* Not available in East Asia.

*Flight record (China):* Male: late May.

### 7. *Andrena (Taeniandrena) ovatula* (Kirby)

(Fig. 10: A-E)

*Melitta ovatula* Kirby, 1802, Monogr. Apum Angl., 2:149-150 [female, England].

*Andrena ovatula*: Stökhert, 1930, in Hymenop. Nord-und Mitteleuropas, 936, 986 [female & male, in key]; Alfken, 1929, Verh. Zool-Bot. Ges. Wien., 79: 333 [Shanghai, China].

*Andrena (Taeniandrena) ovatula*: Hedicke, 1933, Mitt. Zool. Mus. Berlin, 19: 219; Osytsnjuk, 1977, Faun. Ukraini, 12 (5): 187-191; Osytsnjuk, 1995, Key Insects Russian Far East, Vol. IV, Part 1, 506, 523 [female & male, in key]; Schmid-Egger & Scheuchl, 1997, Ill. Bestim. Wildbienen Deuts. und Öter. III: Andrenidae: 88, 137 [female & male, in key].

*Melitta afzeliella* Kirby, 1802, Monogr. Apum Angl., 2:169-171 [female, England].

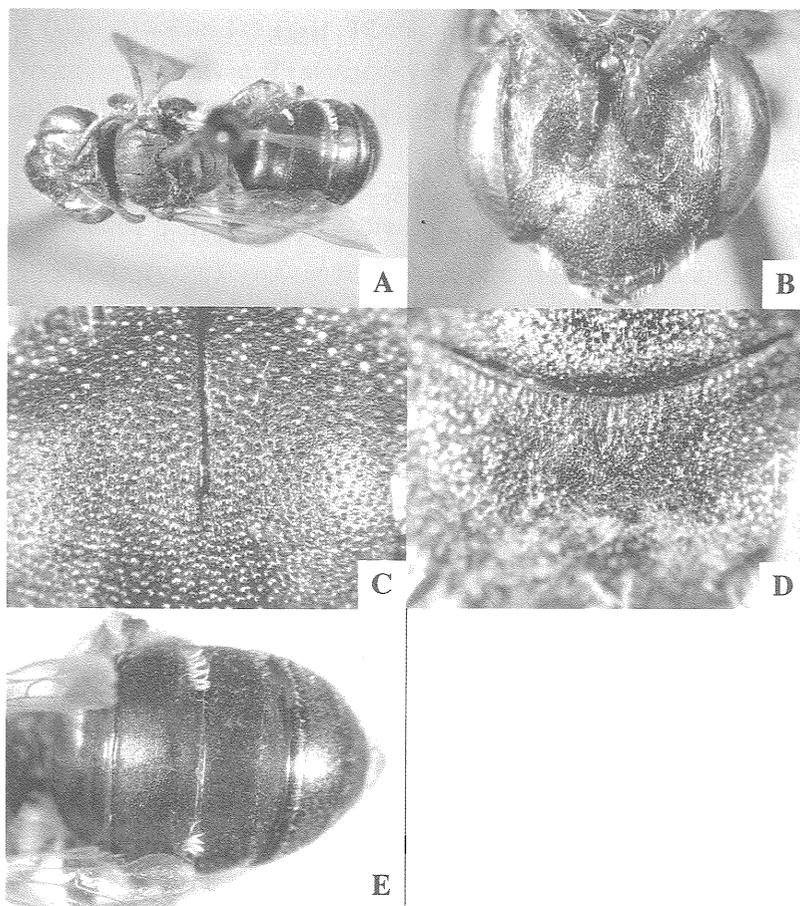
*Redescription*: See Osytsnjuk (1977).

**Female** (redescription based on East Asian material) :BL 9.0-9.5 mm, WL 6.6-7.0 mm (n= 4).

*Color*: Flagellum reddish brown beneath; mandible with apical third or more reddened; wing membranes subhyaline, moderately brown, veins and pterostigma reddish brown; hind tibia and basitarsi reddened; tibial spurs reddish yellow; posterior depressions of metasomal terga reddish brown.

*Pubescence*: Hairs on head and thorax moderate, whitish; those on clypeus 200-300 $\mu$ ; those on antennal area long and dense; those on vertex 300-400 $\mu$ ; facial fovea dark brown. Hairs on mesoscutum and scutellum 200-300 $\mu$ ; those on mesepisternum 400-500 $\mu$ , white; propodeal corbicula with internal long, simple hairs; trochanteral floccus perfect, white; femoral floccus dense; tibial scopal hairs long, simple, white. Hairs on metasomal terga sparse; tergum 1 with lateral apical fringes; terga 2-4 with dense, white hair bands, tergum 2 interrupted, terga 3-4 complete; caudal fimbria pale brown covered with white hairs; sterna 2-5 with long, sparse white subapical fimbriae.

*Structure: Head*: HL/HW = 0.81. HW: MsW: MtW = 3.2: 2.9: 3.1. Vertex roughened with roughened small PP. OOD: POD: OCD = 0.8: 0.5: 0.3. FL1 = FL2+3, FL2 = FL3 which are about as broad as long, intermediate segments as broad as long. Eyes with inner margins subparallel. Facial fovea broad, extending to below a line at lower margin of antennal fossae, FVL = 1.4 mm, FVW = 0.45 mm. Supraclypeal area and face above antennal fossae with weak longitudinal and coarse interrugal PP. Facial quadrangle broader than long (about 2.0: 2.1). Clypeus flattened, weakly granulate, with a narrow median tessellate impunctate space, surface with PP $\phi$ 30-40 $\mu$ , IS < 1 laterally, closer near median line, CPL = 0.9 mm. Process of labrum moderate and



**Fig. 10:** A-E: *Andrena (Taeniandrena) ovatula* (Kirby), female. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

broad, emarginate apically, surface with weak rugulae. Labrum apical to process with distinct median cristae. Lower paraocular area weakly tessellate and shiny with close  $PP\varnothing 20-30\mu$ . Malar space linear. Genal area about as broad as eye,  $GW: EW = 0.6: 0.6$ , surface broadly weakly tessellate and shiny posteriorly, narrowly shiny with linear minute PP near eye. *Mesosoma*: Pronotum weakly tessellate with obscure PP. Mesoscutum densely tessellate anteriorly, weakly tessellate posteromedially, with distinct  $PP\varnothing 20-30\mu$ ,  $IS = 0.5-1$ . Scutellum smooth and shiny with  $PP\varnothing 20\mu$ , sparser medially, denser laterally. Propodeal enclosure slightly irregularly rugulose at basal half, finely granulate at apical half; dorsal face of propodeum densely tessellate with roughened PP. Mesepisternum sculptured as in dorsal face of propodeum, dulled medially. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. *Metasoma*: Metasomal terga elliptic, surface weakly tessellate and shiny, minutely punctate; ter-

gum 1 with apical area with obscure minute PP; terga 2-4 each with basal area with distinct minute PP, IS = 0.5-1, apical area with sparse PP; posterior depressions of terga not well indicated; pygidial plate V-shaped, with weak internal raised area. Sterna 2-5 very weakly tessellate with small PP.

*Specimens examined:* CHINA: Xinjiang Uygur Autn. Region: 1 female, Tacheng, 21. vii. 1955 (S-j. Ma); 1 female, Malasi, 415-550 m, 7. vi. 1957 (G. Wang); 1 female, Malasi, 400-550 m, 8. vi. 1957 (X-p. Hong); 1 female, Wusu, 340 m, 24. vi. 1957 (X-p. Hong).

*Remarks:* This species is similar to *Andrena gelriae* Vecht and *A. wilkella* (Kirby). But the female of this species is separated from those of *gelriae* and *wilkella* by the clypeus densely tessellate with elongate punctures, the mesoscutum weakly tessellate medially, the metasomal terga with weaker punctures, the facial fovea dark brown, the head and thorax with long white hairs. The male of this species is recognized by the FL1 as long as FL2, the propodeal enclosure with rugose at basal 2/3 and the metasomal terga with white to yellow apical hair bands developed, T3-4 complete.

*Distribution:* China (new record: Xinjiang Uygur Autn. Region); Russia (Far East Area), Central Asia, middle to north Europe, European Russia.

*Floral association:* Not available in East Asia.

*Flight records*(China): Female: early June to late July.

### 8. *Andrena (Taeniandrena) gelriae* Vecht

*Andrena gelriae* Vecht, 1927, Zool. Mededelingen, Leiden, 10: 87-89 [female & male, Holland].

*Andrena (Taeniandrena) gelriae:* Hedicke, 1933, Mitt. Zool. Mus. Berlin, 19: 219. Niemelä, 1949, Ann. Ent. Fenn. 15(3): 112-116; Osytshnjuk, 1977, Faun. Ukraini, 12 (5): 193-194; Osytshnjuk, 1995, Key Insects Russian Far East, Vol. IV, Part 1, 507, 523 [female & male, in key]; Schmid-Egger & Scheuchl, 1997, Ill. Bestim. Wildbienen Deuts. und Öster. III: Andrenidae: 89, 136 [female & male, in key].

*Andrena podolica* Noskiewicz, 1930, Polsk. Pismo Ent., 9: 265-267 [female & male, W-Ukraine].

*Redescription:* See Osytshnjuk (1977).

*Specimens examined:* Not available in this study from East Asia. Reference material: SWEDEN: 1 female and 1 male, Sk. Baskemölla, 21. vi. 1957 (S. Erlandsson) (both determined by Erlandsson).

*Remarks:* Although we could not examine material collected from East Asia,

Osytsnjuk (1995) recorded this species from Russian Far East. This species is similar to *Andrena wilkella* (Kirby). The female of this species is recognized by the thorax with short yellow hairs, the legs ferruginous, the caudal fimbria whitish brown and the head longer. The male of this species is separable by the clypeus weakly tessellate with long dense white hairs, the mesoscutum densely tessellate medially and the metasomal terga with apical hair fringes well developed, T3 narrowly interrupted and T4 complete.

*Distribution*: Russia (Far East Area, European Russia), middle to north Europe.

*Floral association*: Not available in East Asia.

*Flight records*: Not available in East Asia.

### 9. *Andrena (Taeniandrena) wilkella* (Kirby)

(Figs. 11: A-E, 12: A-E)

*Melitta wilkella* Kirby, 1802, Monogr. Apum Angl., 2: 145-146 [female, England].

*Andrena wilkella*: Stöckhert, 1930, in Hymenop. Nord- und Mitteleuropas, 935, 984 [female & male, in key].

*Andrena (Taeniandrena) wilkella*: Niemelä, 1949, Ann. ent. Fenn. Helsinki, 15 (3): 106-107 [female & male, Finland]; Osytsnjuk, 1977, Faun. Ukraini, 12(5): 191-192; Schmid-Egger & Scheuchl, 1997, Ill. Bestim. Wildbienen Deuts. und Öster. III: Andrenidae: 88-89, 136 [female & male, in key].

*Melitta xanthura* Kirby, 1802, Monogr. Apum Angl., 2: 164-166 [female & male, England].

*Andrena xanthura*: Schmiedeknecht, 1882-1884, Apid. Europ., 1: 793-795 [female & male].

*Melitta convexuscula* Kirby, 1802, Monogr. Apum Angl., 2: 166-167 [female, England].

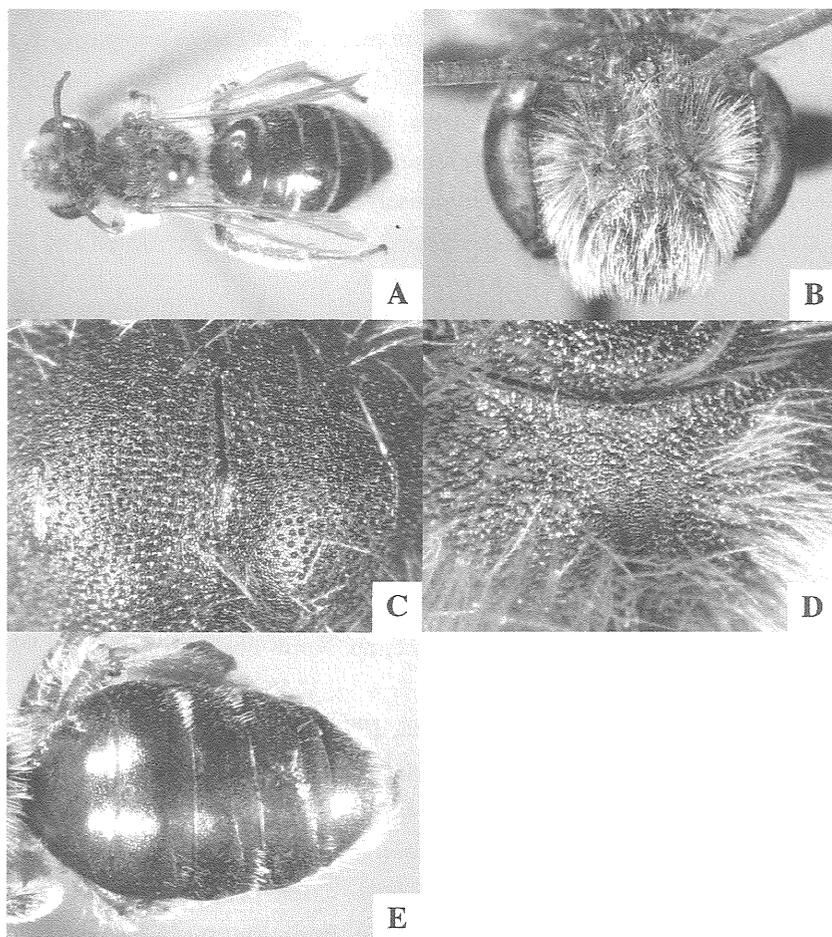
*Andrena convexuscula*: Schmiedeknecht, 1882-1884, Apid. Europ., 1: 796-800 [female & male].

*Andrena convexa* Schenck, 1853, Jb. Ver. Natk, Nassau, 9: 125 [female & male, Germany].

*Redescription*: See Osytsnjuk (1977).

**Female** (redescription based on East Asian material) : BL 10.3-12.4 mm, WL 8.5-8.8 mm (n= 12).

*Color*: Flagellum brown beneath; mandible with apical third or more reddened; wing membranes subhyaline, moderately brown, veins and pterostigma reddish brown; hind tibia and basitarsi dark brown; tibial spurs yellow; posterior depressions of metasomal terga reddish brown.



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

*Pubescence:* Hairs on head and thorax moderate, dull whitish; those on clypeus 200-400 $\mu$ ; those on antennal area long and dense; those on vertex 400-600 $\mu$ ; facial fovea light brown. Hairs on mesoscutum and scutellum 200-300 $\mu$ ; those on mesepisternum 400-500 $\mu$ , white; propodeal corbicula with internal long, simple hairs; trochanteral floccus perfect, pale yellow; femoral floccus dense; tibial scopal hairs long, simple, yellow. Hairs on metasomal terga sparse; terga 2-4 with dense, white hair bands, tergum 2-4 interrupted; caudal fimbria brown; sterna 2-5 with long, sparse pale yellow subapical fimbriae.

*Structure: Head:* HL/HW = 0.81. HW: MsW: MtW = 3.6: 3.5: 3.6. Vertex roughened with small roughened PP. OOD: POD: OCD = 1.5: 0.9: 0.6. FL1 = FL2+3, FL2 > FL3 which are about as broad as long, intermediate segments as broad as long.

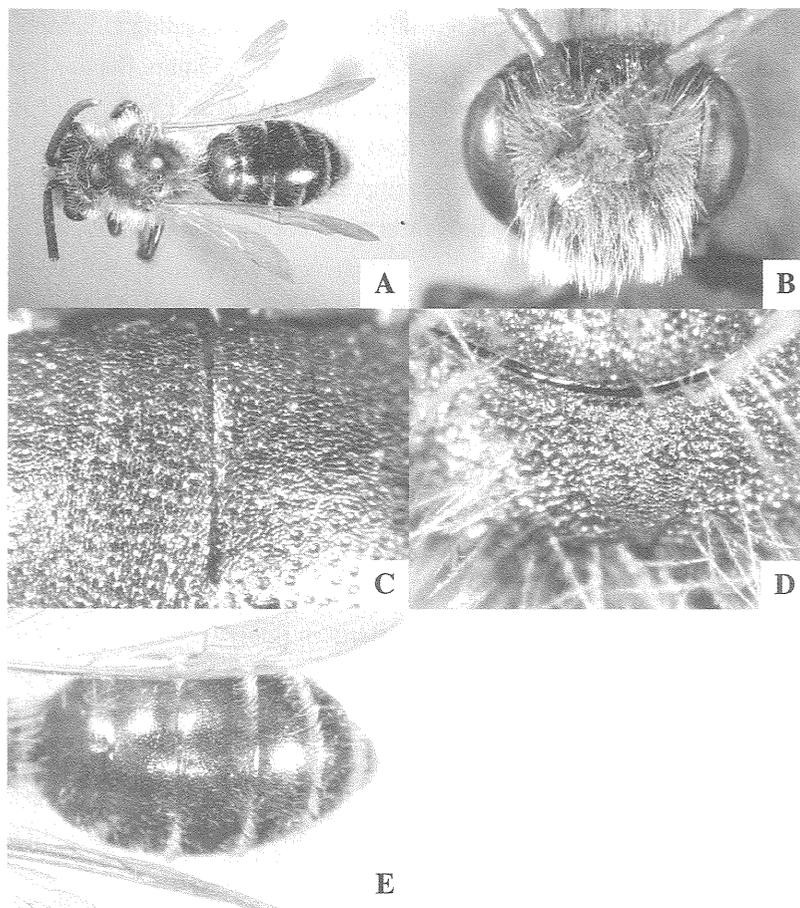
Eyes with inner margins subparallel. Facial fovea broad, extending to below a line at lower margin of antennal fossae, FVL = 1.5 mm, FVW = 0.55 mm. Supraclypeal area and face above antennal fossae with weak longitudinal and coarse interrugal PP. Facial quadrangle broader than long (about 2.3: 2.4). Clypeus markedly flattened, weakly granulate, with a narrow median tessellate impunctate space, surface with fine close PP  $\phi$ 20-40 $\mu$ , IS = 1 laterally, closer and a little roughened near median line, CPL = 1.0 mm. Process of labrum large and broad, emarginate apically, surface with weak curved rugulae at base. Labrum apical to process with distinct median cristae. Lower paraocular area smooth and shiny crowdedly punctate with PP  $\phi$ 20-30 $\mu$ . Malar space linear. Genal area narrower than eye, GW: EW = 0.6: 0.7, surface weakly tessellate all over with indistinct PP near eye. *Mesosoma*: Pronotum weakly granulate medially and smooth and shiny anterolaterally with minute PP. Mesoscutum densely tessellate anteriorly, weakly tessellate posteromedially, with weak PP  $\phi$ 20 $\mu$ , IS < 1. Scutellum smooth and shiny with PP  $\phi$ 20 $\mu$ , sparser medially, denser laterally. Propodeal enclosure slightly irregularly rugulose at basal half, finely granulate at apical half; dorsal face of propodeum roughened with roughened PP. Mesepisternum finely tessellate with roughened PP. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. *Metasoma*: Metasomal terga elliptic, surface densely tessellate and minutely punctate; tergum 1 with apical area with obscure minute PP; terga 2-4 each with basal area with more or less distinct minute PP, IS = 1-2, apical area with sparse indistinct PP; posterior depressions of terga not well indicated; pygidial plate V-shaped, with internal raised area. Sterna 2-5 very weakly tessellate and shiny with minute PP.

**Male** (redescription based on East Asian material): BL 9.0-9.04 mm, WL 7.1-7.3 mm (n=10).

*Color*: Flagellum brown beneath; mandible with apical third reddened; wing membranes subhyaline, moderately brown, veins and pterostigma yellowish brown; hind femur mostly, tibia and basitarsi deep brown; tibial spurs reddish yellow; posterior depressions of metasomal terga reddish brown.

*Pubescence*: Hairs on head and thorax dense, white to pale yellow; those on clypeus 400-550 $\mu$ , white; those on vertex 500-600 $\mu$ , pale yellow; those on mesoscutum and scutellum 400-500 $\mu$ , pale yellow; those on mesepisternum long, white; legs with pale yellow hairs. Hairs on metasomal terga 1-2 white, slightly long laterally, terga 3-5 very short, brown; terga 2-5 with dense pale yellow hair bands, interrupted on terga 1-3, complete on terga 4-5; sterna 2-5 with long, well-formed pale yellow subapical fimbriae.

*Structure: Head*: HL/HW = 0.79. HW: MsW: MtW = 3.0: 2.7: 2.8. Vertex smooth and shiny with indication of roughened PP. OOD: POD: OCD = 1.1: 0.7: 0.5. Flagellar segments long, FL1 < FL2, FL2 > FL3. Eyes with inner margins subparallel.



**Fig. 12:** A-E: *Andrena (Taeniandrena) wilkella* (Kirby), male. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

Supraclypeal area and face above antennal fossae with fine longitudinal rugulae and coarse interrugal PP. Facial quadrangle quadrate (about 2.0: 2.0). Clypeus flattened, smooth and shiny, surface with close deep PP  $\varnothing$  30-40 $\mu$ , IS < 0.5, without a median impunctate line, CPL = 0.9 mm. Process of labrum small, deeply emarginate apically, surface smooth and shiny. Mandibles decussate. Lower paraocular area smooth and shiny with close PP. Malar space linear. Genal area as well as eye, GW: EW = 0.6: 0.6, surface weakly tessellate, weakly shiny with obscure PP near eye. *Mesosoma*: Mesoscutum densely tessellate anteriorly, weakly tessellate and shiny medioapically with weak PP. Propodeal enclosure weakly rugulose at basal 2/3, tessellate at apical 1/3; dorsal face of propodeum and mesepisternum roughened by coarse punctation. *Metasoma*: Metasomal terga weakly tessellate and shiny, surface with weak, shallow minute PP, IS = 1 on terga 1-2, closer on terga 3-5; posterior depressions of terga not

well indicated. Sterna 2-5 finely tessellate with fine PP, IS =1-2 apically; sternum 6 flat, not emarginate.

*Specimens examined*: CHINA: Shanghai (O. Piel): 1 female and 3 males, 17. iv. 1930; 1 male, 20. iv. 1930; 2 males, 26. iv. 1930; 1 female, 30. iv. 1930; 1 female and 1 male, 2. v. 1930; 1 female, 1. v. 1935; 1 female, 4. v. 1935; 1 female, 21. v. 1935; 1 female, Shanghai, 6. iv. 1933 (A. Savio). Shannxi Province: 3 females, Meixian, 9. vi. 1976 (W-z. Ma); 1 male, Xian, 26. v. 1936. Jiangsu Province: 1 female, Nanjing, 11. v. 1930. Zhejiang Province: 1 female, Mokanshan, 30. v. 1936 (O. Piel); 1 male, Chusan, 17. iv. 1931 (O. Piel); 1 female and 18 males, Tianmushan, 20-22. iv. 1996 (O. Tadauchi); 21 males, 20-22. iv. 1996 (H-l. Xu). Xinjiang Uygur Autn. Region: 1 male, Wulumuqi, 30. v. 1974 (J-p. Liu).

*Remarks*: This species is similar to *Andrena gelriae* Vecht. But the female of this species is recognized by the thorax with short white hairs, the legs partly brown, the caudal fimbria light brown and the head shorter. The male of this species is recognized by the clypeus smooth and shiny with sparser white hairs, the mesoscutum weakly tessellate medially, the legs black and the metasomal terga with yellowish apical hair bands, T1-3 and rarely T4 interrupted.

*Distribution*: China (Shanghai, Shannxi, Jiangsu Provs., Xinjiang Uygur Autn. Region), Russia (Far East Area, European Russia), middle to north Europe.

*Floral association*: One female and some males were collected on *Astragalus sinicus* in China.

*Flight records*: Female: early April to early June, male: mid April to late May.

### 10. *Andrena (Taeniandrena) steini* n. sp.

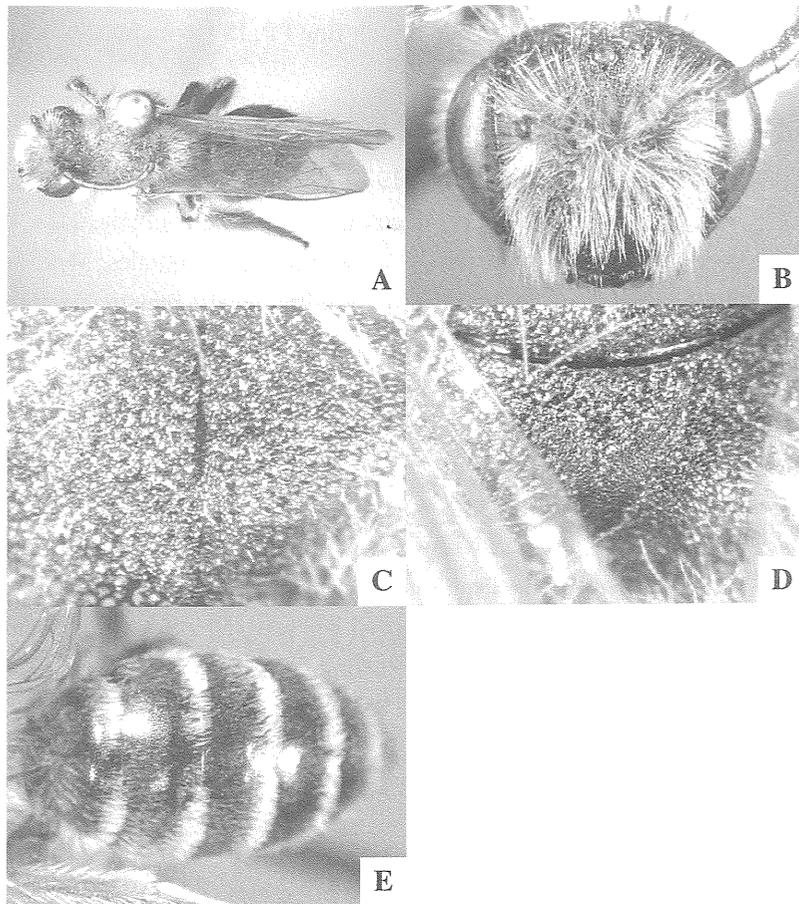
(Fig. 13: A-E)

**Male**: BL 10.3 mm, WL 8.5 mm (n=1).

*Color*: Flagellum brown beneath; mandible with apical third reddened; wing membranes subhyaline, moderately brown, veins and pterostigma reddish brown; hind tibia apically and basitarsi reddened; tibial spurs yellow; posterior depressions of metasomal terga reddish brown.

*Pubescence*: Hairs on head and thorax dense, yellow; those on clypeus 400-600 $\mu$ ; those on vertex 500-600 $\mu$ ; those on mesoscutum and scutellum 600-800 $\mu$ ; those on mesepisternum long; legs with yellow hairs. Hairs on metasomal terga 1-2 slightly long laterally; terga 1-5 with dense white hair bands, interrupted on terga 1-2, complete on terga 3-5; sterna 2-5 with short, well-formed yellow subapical fimbriae.

*Structure: Head*: HL/HW = 0.81. HW: MsW: MtW = 3.1: 3.0: 3.1. Vertex roughened with roughened PP. OOD: POD: OCD = 1.6: 0.9: 0.5. Flagellar segments long, FL1 <



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

FL2, FL2=FL3. Eyes with inner margins subparallel. Supraclypeal area and face above antennal fossae with fine longitudinal rugulae and coarse interrugal PP. Facial quadrangle quadrate (about 2.0: 2.1). Clypeus flattened, smooth and shiny, surface with close deep PP  $\varnothing 20-40\mu$ , IS < 0.5, with a shiny median impunctate line, CPL = 0.9 mm. Process of labrum small, deeply emarginate apically, surface smooth and shiny. Mandibles decussate. Lower paraocular area smooth and shiny with close PP. Malar space linear. Genal area broader than eye, GW: EW = 0.7: 0.5, surface weakly tessellate, weakly shiny with obscure PP near eye. *Mesosoma*: Mesoscutum weakly tessellate anteriorly, very weakly tessellate and shiny medioapically with weak PP. Propodeal enclosure weakly rugulose at basal 1/2, tessellate at apical 1/2; dorsal face of propodeum and mesepisternum roughened by coarse punctation. *Metasoma*: Metasomal terga smooth and shiny, surface with distinct minute PP, IS < 1 on terga 1-2, closer

on terga 3-5; posterior depressions of terga not well indicated. Sterna 2-5 weakly tessellate and shiny with fine PP, IS = 1 apically; sternum 6 flat, not emarginate.

*Type material:* Holotype male, Puochengzi, Wensu, 1,930 m, Xinjiang Uygur Autn. Region, 15. vi. 1978 (X-z. Zhang). Other material: 1 stylopized female, Shaosu, 1,950 m, 17. vii. 1978 (Y-h. Han).

*Remarks:* This species is similar to *Andrena gelriae* Vecht in male in having the FL1 shorter than FL2 which is about as FL3, the hairs on head and thorax yellowish and the hind tibia apically and tarsi reddened. But it is distinguished from the male of *gelriae* by the mesoscutum weakly tessellate and shiny, the metasomal terga smooth and shiny with apical fringes, T3-5 complete, and the hairs on clypeus sparse.

*Distribution:* China (Xinjiang Uygur Autn. Region).

*Floral association:* Not available.

*Flight records:* Male: mid June.

*Etymology:* The specific name is dedicated to English archaeologist Sir Aurel Stein who is linked with the Silk Road and uncovered a long-lost Buddhist civilization which had lain for a thousand years beneath deserts in Xinjiang Uygur, China.

### 11. *Andrena (Taeniandrena) opercula* Wu

*Andrena (Taeniandrena) opercula* Wu, 1982, Insects of Xizang, 2: 381 [female, Tibet]; Gusenleitner & Schwarz, 2001, Entomofauna, 22: 314.

*Description.* See Wu (1982) and Gusenleitner & Schwarz (2001, translate into German).

*Specimens examined:* Not available in this study.

*Notes:* As we could not examine the type material in this study, we only cite here. We will make some comments on this species including subgeneric position of this species after examining it in near future.

*Distribution:* China (Tibet).

*Floral association:* Not available.

*Flight records:* Female: late June.

### 12. *Andrena (Taeniandrena) subopercula* Wu

*Andrena (Taeniandrena) subopercula* Wu, 1982, Insects of Xizang, 2: 382 [female, Tibet]; Gusenleitner & Schwarz, 2001, Entomofauna, 22: 329.

*Description.* See Wu (1982) and Gusenleitner & Schwarz (2001, translate into German).

*Specimens examined:* Not available in this study.

*Notes:* As we could not examine the type material in this study, we only cite here. We will make some comments on this species including subgeneric position of this species after examining it in near future.

*Distribution:* China (Tibet).

*Floral association:* Not available.

*Flight records:* Female: late July.

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