

## The Family Andrenidae of Korea (Hymenoptera, Apoidea) II

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## The Family Andrenidae of Korea (Hymenoptera, Apoidea) II<sup>1), 2)</sup>

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**Abstract.** Thirteen species of the genus *Andrena* are recorded from the Cheju Island and 4 species from the Korean Peninsula. One new species, *Andrena (Andrena) dolharubang* is described from the Cheju Island. Two males of *Andrena (Melandrena) koreana* Hirashima and *Andrena (Plastandrena) magnipunctata* Kim et Kim are newly described and the female of *Andrena (Oreomelissa) amurensis* Friese is redescribed. *Andrena (Lepidandrena) lebedevi* Popov is recognized as a new synonym of *Andrena chengtehensis* Yasumatsu. Five species are newly recorded from Korea and 9 are from the Cheju Island. With the completion of this study, 52 Korean species of the genus *Andrena* are listed including records in the literature.

Key words: Taxonomy, Hymenoptera, Andrenidae, *Andrena*, Korea, Cheju Is., new species, list.

### Introduction

Korean species of the genus *Andrena* have been studied by Hirashima (1952a, b, 1957, 5 spp.), Kim (1970, 11 spp.), Kim and Kim (1983, 9 spp.; 1989, 4 spp.), Kim *et al.* (1990, 6 spp.), Tadauchi and Lee (1992, 24 spp.) and Kifune *et al.* (1994, 4 spp., hosts of Korean Strepsiptera). In total, Shin *et al.* (1994) listed 31 species in "Check List of Insects from Korea". It was suspected that more *Andrena* species inhabited Korea.

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Two of the authors, Tadauchi and Paik, made a collection trip to the Cheju Island, south Korea during April 22-26, 1997. Based on the collection, we record 13 species of the genus *Andrena* from the Cheju Island including 1 new species, 2 newly recorded males and 9 new records from the island, one of which is also a new record from Korea. After examining the old collection of Kyushu University, we add 4 more species to the Korean fauna of the genus. *Andrena (Lepidundrena) lebedevi* Popov is recognized as a new synonym of *Andrena chengtehensis* Yasumatsu.

With the completion of this study, 52 species of the genus *Andrena* are known from Korea at present. The holotype of *Andrenu (Andrena) dolharubang* Tadauchi et Xu and several specimens of the other species recorded on the Cheju Island are preserved in Cheju Folklore & Natural History Museum, Cheju Island, Korea.

### I. The genus *Andrena* collected on the Cheju Island

Paik *et al.* (1995) listed 6 species of the genus *Andrena* from the Cheju Island. They were based on fragmental records by Kim (1984, 1989, 1993), Lee *et al.* (1985). Kim and Oh (1990, 1991), and Tadauchi and Lee (1992). One of them was misrecorded as *Andrena okinawana* instead of *A. ezoensis* recorded by Tadauchi and Lee (1992). Three more species were found which had been recorded previously on the island (Kim and Kim, 1989; Kim *et al.*, 1990). One of them was the type locality of *Andrena magnipunctata* Kim et Kim. *Andrenu (Simundrena) opucifovea koreana* Kim et Kim was recognized as a synonym of *Andrenu yamato* Tadauchi et Hirashima (Tadauchi and Xu, 1995).

In the present field collections, 13 species were collected from a total of 19 species known to occur on the island to date. On Tsushima Island, situated between the Korean Peninsula and Kyushu, Japan, 22 species of *Andrena* were recorded (Tadauchi, 1988). If the number of species collected in the Tsushima Island is taken into account along with the geography of the Cheju Island, where a high mountain exists, it is speculated that approximate 10 more species will be added to the fauna of the Cheju Island by future surveys.

#### 1. *Andrena (Andrena) benefica* Hirashima

*Andrenu (Andrena) benefica* Hirashima, 1962, J. Fac. Agr., Kyushu Univ., 12: 151-154 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 104-115 [female, male, in key]; Tadauchi *et al.*, 1987, J. Fac. Agr., Kyushu Univ., 3 1: 45-46 [biology, in key]; Tadauchi, 1989, Check List Jap. Insects, 683 [in list]; Osytsnjuk, 1995, Key Insects Russian Far East, vol. IV. Part 1, 5 16, 522 [female, male, in key, Russian Far East].

*Andrenu (Andrena) benifica* (sic): Kim & Kim, 1983, Kor. J. Ent., 13: 5-6 [Korea].

*Andrenu (Andrena) binifica* (sic): Shin *et al.*, 1994, Check List Insects Kor., 266 [in list].

*Specimen examined:* [Cheju Is.] 1 female, Pijarim Forests, Pukcheju-gun. Cheju Is., Korea, 24. iv. 1997 (O. Tadauchi).

*Floral record* (Korea): *Brassica campestris*.

*Distribution:* Korea (Cheju Is.: new record, central Korea); Japan (Hokkaido, Honshu, Sado Is., Shikoku, Kyushu); Russia (Far East area).

2. *Andrena (Andrena) dolharubang* Tadauchi et Xu, n. sp.

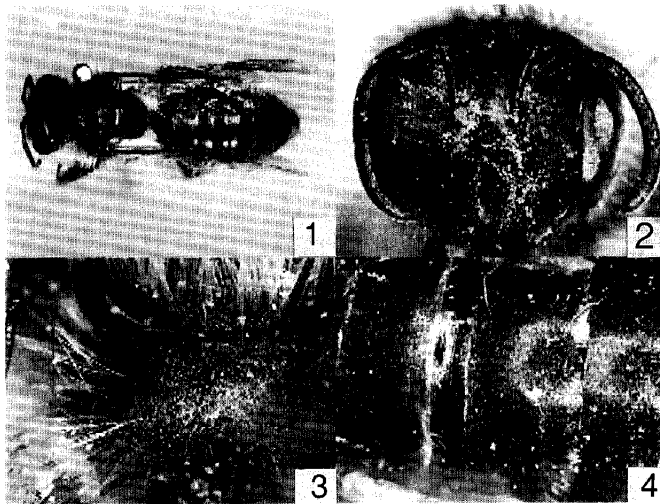
(Figs. 1-4)

**Female:** BL 11 mm, WL 8.7 mm ( $n=1$ ).

*Color:* Flagellum deep brownish beneath; mandible with apical third reddened; wing membrane subhyaline, moderately brown; veins and pterostigma brownish; tibial spurs yellowish; posterior depressions of metasomal terga reddish brown translucent.

*Pubescence:* Hairs on head moderately long, pale yellowish; those on clypeus 200-300 $\mu$ , rather sparse; those on antennal area denser and longer; those on vertex 400-600 $\mu$ , not mixed with brownish; those on genal area shorter; facial fovea deep brown. Hairs on mesoscutum 400-700 $\mu$ , dull whitish; those on scutellum dense, pale yellowish posteriorly; those on mesepisternum long, pale yellowish; propodeal corbicula developed with long, dense dorsal fringes, without internal hairs; trochanteral floccus perfect, pale yellowish, femoral floccus dense, tibial scopa more or less loose, composed of long, yellowish hairs. Hairs on metasomal terga sparse; T<sub>1</sub> with long, erect, dull whitish hairs; T<sub>2-4</sub> with obscure, loose, dull white hair fringes, interrupted on T<sub>2</sub>; caudal fimbriae pale brown; S<sub>2-5</sub> with subapical fimbriae, yellowish.

*Structure: Head:* HL / HW = 0.86. HW : MsW : MtW = 3.1 : 3.3 : 3.4. Vertex roughened by coarse punctation. OOD : POD : OCD = 0.60 : 0.20 : 0.25. FL<sub>1</sub> > FL<sub>2+3</sub>,



**Figs. 1-4.** *Andrena (Andrena) dolharubang* n. sp., 1: dorsal view of the whole body; 2: head in frontal view; 3: propodeum; 4: metasomal terga.

FL<sub>2</sub> = FL<sub>3</sub>, FL<sub>2</sub> with broader than long. Eyes with inner margins subparallel. Facial fovea extending a line running between lower margins of antennal fossae, FVL = 1.25 mm, FVW = 0.45 mm. Facial quadrangle longer than broad, (about 2.7 : 2.25). Face above antennal fossae strongly roughened with longitudinal rugulae, interrugal space with coarse PP. Clypeus convex, smooth and shiny, surface with PP $\phi$  40 $\mu$ , IS = 0.4-1. CPL = 1.0 mm. Process of labrum moderate, transverse, not emarginate in the middle. Lower paraocular area sculptured as in clypeus. Malar space linear. Genal area broader than eye, GW : EW = 0.8 : 0.5, surface weakly tessellate posteriorly, narrowly shiny near eye.

*Mesosoma*: Pronotum with weak humeral angle, without dorsoventral ridge, surface densely tessellate; pronotum with subapical margin emarginate in the middle. Mesoscutum and scutellum finely tessellate with PP $\phi$  30-40 $\mu$ , IS = 0.5-1, denser posteriorly. Propodeal enclosure rugose at basal half, finely tessellate at apical half: dorsal face of propodeum shagreened. Mesepisternum densely tessellate. *Metasoma*: Metasomal terga densely tessellate with indistinct, sparse PP $\phi$  20 $\mu$ , IS = 3-5; posterior depressions of terga not well indicated. Pygidial plate U-shaped with weak internal triangular area. S<sub>2-5</sub> finely tessellate.

Type *material*: Female, Kwangpyong-ri, Namjeju-gun, Cheju Is., Korea, 23. iv. 1997 (O. Tadauchi).

*Remarks*: This species is similar to *Andrena Eongitibialis* Hirashima, but is differed from it by having the pronotum with subapical margin emarginate in the middle, the tibial scopa yellowish and the clypeus smooth and shiny broadly.

*Distribution*: Korea (Cheju Is.).

*Floral record*: *Brassica campestris*.

*Flight record*: Female: late April.

*Etymology*: Dolharubang is a name of a stone image and was a guardian deity in the Cheju Island.

### 3. *Andrena (Hoplandrena) dentata* Smith

*Andrena dentata* Smith, 1879, Descr. New Spec. Hym., 51 [male, Japan]: Dalla Torre, 1896, Cat. Hym., 10: 117 [in list]; Cockerell, 1913, Ann. Mag. nat. Hist., (8) 11: 189 [male, in key]; Yasumatsu, 1941, Peking nat. Hist., Bull., 15: 275 [in list]; Kim, 1970, Ill. Encycl. Faun. Fl. Korea, 11 (3): 659 [Korea].

*Andrena biscutata* Perez, 1905, Bull. Mus. d'Hist. nat. Paris, 1905: 33-34 [female & male, Japan]; Cockerell, 1913, Ann. Mag. nat. Hist., (8) 11: 190 [in key].

*Andrena (Hoplandrena) dentata*: Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 84-87 [female & male, redescription, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 100, 115 [female, male, in key]; Tadauchi & Hirashima, 1984, Kontyû, 52: 284-285 [in key]; Tadauchi, 1988, Bull. Nagasaki biol. Soc., (33): 3 [Tsushima Is., Japan]; Tadauchi, 1989, Check List Jap. Insects, 684 [in list]; Tadauchi & Lee, 1992, Esakia, (32): 50 [Korea]; Shin *et al.*, 1994, Check List Insects Kor., 266 [in list]; Osytsnjuk, 1995, Key Insects Russian Far East, vol. IV. Part 1, 501, 520 [female, male, in key, Russian Far East].

**Specimens examined:** [Cheju Is.] 1 female, Pijarim Forests, Pukcheju-gun, 24. iv. 1997 (O. Tadauchi); 2 females, Schwa Beach, Pukcheju-gun, 25. iv. 1997 (O. Tadauchi).

**Floral record** (Korea): *Brassica campestris*.

**Distribution:** Korea (Cheju Is.: new record, southern Korea); Japan (Honshu, Shikoku, Kyushu, Tsushima Is.).

#### 4. *Andrena (Leucandrena) delicatula* Cockerell

*Andrena delicatula* Cockerell, 1918, Ann. Mag. nat. Hist., (9) 2: 48 1-482 [male, China]; Yasumatsu, 1941, Peking nat. Hist. Bull., 15: 275 [in list].

*Andrena (Leucandrena) delicatula*: Xu & Tadauchi, 1977, Esakia, (37): 180-181 [China].

*Andrena (Simandrena) koma* Hirashima, 1952b, Mushi, 24: 32-33 [female, Korea]; Tadauchi & Lee, 1992, Esakia, (32): 51 [in list, Korea]; Shin et al., 1994, Check List Insects Kor., 266 [in list]; Tadauchi & Xu, 1995, Esakia, (35): 210 [China, Korea].

**Specimens examined:** [Cheju Is.] 7 females, Kwangpyong-ri, Namjeju-gun, 23. iv. 1997 (O. Tadauchi); 17 females, Pijarim Forests, Pukcheju-gun, 24. iv. 1997 (O. Tadauchi); 11 females, Schwa Beach, Pukcheju-gun, 25. iv. 1997 (O. Tadauchi); 3 females, Chonjiyen, Waterfall, Sogwipo-shi, 25. iv. 1997 (O. Tadauchi); 2 females, Shinsan-ri, Namjeju-gun, 25. iv. 1997 (O. Tadauchi); 4 females (J-c. Paik) and 4 females (O. Tadauchi), Mt. Halla, 300 m, Haean-dong, 26. iv. 1997.

**Floral records** (Korea): *Rhododendron* sp., *Sagina japonica*, *Brassica campestris*, *Calendula arvensis*.

**Distribution:** Korea (Cheju Is.: new record, southern and central Korea); China (Shanghai, Jiangsu Prov.).

#### 5. *Andrena (Melandrena) crassepunctata* Cockerell

*Andrena crassepunctata* Cockerell, 1931, Amer. Mus. Nov., (446): 10-11 [female, China]; Yasumatsu, 1941, Peking nat. Hist. Bull., 15: 275 [in list]; Kim, 1970, Ill. Encycl. Faun. Fl. Korea, 11 (3): 659-660 [Korea].

*Andrena crassepunctata* (sic): Wu, 1965, Econ. Insects China XI, Apoidea: 32 [China].

*Andrena (Gymnandrena) crassepunctata*: Hirashima, 1957, Mushi, 30: 63 [in list, S. Manchuria, Korea].

*Andrena (Gymnandrena) crassepunctata* (sic): Kim *et al.*, 1990, Ent. Res. Bull. 16: 2-3 [Korea]; Shin *et al.*, 1994, Check List Insects Kor., 266 [in list].

**Specimen examined:** [Cheju Is.] 1 female, Schwa Beach, Pukcheju-gun, 25. iv. 1997 (O. Tadauchi).

**Floral record** (Korea): *Brassica campestris*.

**Distribution:** Korea (Cheju Is., central Korea); China (Shanghai, Jiangsu, Zhejiang Provs., north east Provinces).

**6. *Andrena (Melandrena) koreana* Hirashima**

(Figs. 5-13)

*Andrena (Gymnandrena) koreana* Hirashima, 1952b, Mushi, 24: 29-30 [female, Korea]; Hirashima, 1957, Mushi, 30: 64 [in list]; Kim, 1970, Ill. Encycl. Faun. Fl. Korea, 11: 659 [Korea]; Kim *et al.*, 1990, Ent. Res. Bull., 16: 3 [in list, Korea]; Shin *et al.*, 1994, Check List Insects Kor., 266 [in list].

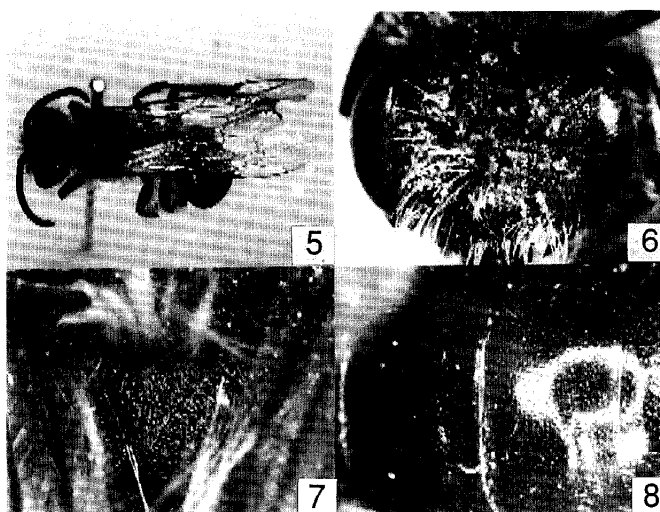
*Andrena koreana*: Paik *et al.*, **1995**, Insects Quelpart Is., 460 [Cheju Is.].

**Male** (new to science): BL 9.7 mm, WL 7.8 mm ( $n=2$ ).

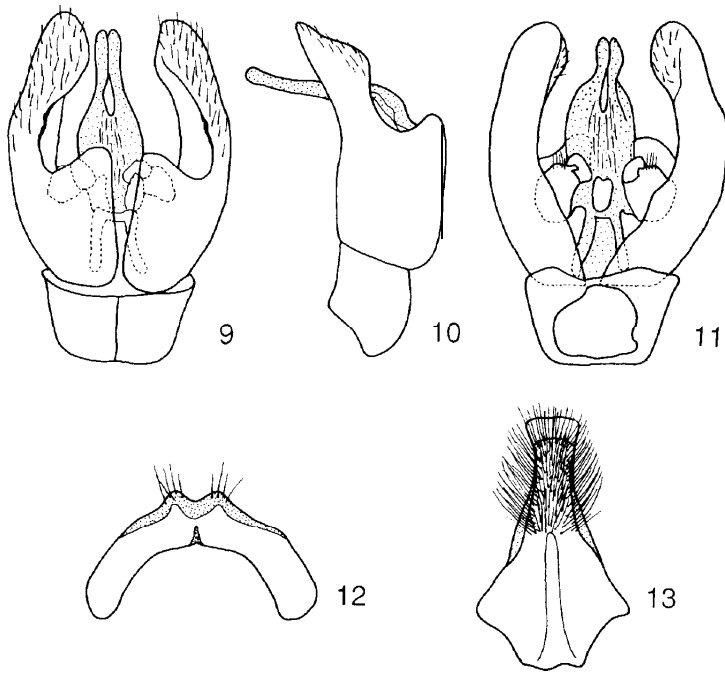
**Color:** Flagellum black beneath; mandible reddened apically; wing membrane subhyaline, pale brownish, veins and pterostigma brownish; tibial spurs yellowish; posterior depressions of metasomal terga dark reddish brown.

**Pubescence:** Hairs on head not so dense, pale yellowish to dull whitish; those on clypeus  $500\mu$ , yellowish; those on vertex  $500\mu$ , sparse, dull whitish; those on genal area sparse near eye, longer and denser posteriorly. Hairs on thorax dense, pale yellowish; those on mesoscutum and scutellum  $800-1000\mu$ , those on mesepisternum  $1000\mu$ , paler; those on legs short, yellowish except inner surface of basitarsi yellowish brown. Hairs on metasomal terga scanty, those on T<sub>1-4</sub> short, rather sparse at lateral margins, whitish; those on T<sub>5-6</sub> brown; T<sub>2-4</sub> without hair band; S<sub>2-5</sub> with not well-formed subapical fimbriae, whitish.

**Structure: Head:** HL / HW = 0.77. HW : MsW : MtW = 3.2 : 2.7 : 3.1. Vertex weakly roughened by coarse tessellation and punctation. OOD : POD : OCD = 0.7 : 0.4 : 0.3. FL<sub>1</sub> = FL<sub>2</sub> = FL<sub>3</sub> with longer than broad. Eyes with inner margins paralleled. Face above



**Figs. 5-8.** *Andrena (Melandrena) koreana* Hirashima, 5: dorsal view of the whole body; 6: head in frontal view; 7: propodeum; 8: metasomal terga.



**Figs. 9-13.** *Andrena (Melandrena) koreana* Hirashima, genital capsule and subgenital sterna: 9: dorsal view of genital capsule; 10: lateral view of the same; 11: ventral view of the same; 12: metasomal sternum S7; 13: S8.

antennal fossae with longitudinal rugulae, interrugal space with coarse PP, weakly roughened. Facial quadrangle slightly broader than long (about 2.2 : 2.0). Clypeus well convex, surface weakly roughened by reticular tessellation. CPL = 0.7 mm. Process of labrum moderate, trapezoidal, slightly and broadly emarginate apically, shiny. Mandibles long, decussate. Lower paraocular area sculptured as in clypeus. Malar space linear. Genal area broader than eye, GW : EW = 1.2 : 0.8, surface with weak rugulae posteriorly, weakly tessellate with close PP near eye. *Mesosoma*: Pronotum without humeral angle and ridge, surface tessellate with sparse PP. Mesoscutum strongly tessellate mostly, weakly tessellate medially, with PP  $\phi$  20 $\mu$ , IS < 1 or IS = 1. Scutellum strongly tessellate posteriorly, feebly shiny anteriorly with PP  $\phi$  20 $\mu$ , IS < 1. Propodeal enclosure narrow, triangular, rugosed at basal half, densely tessellate apically; dorsal face strongly rugosed with coarse punctation; lateral face rugosed above, densely tessellate below. Mesepisternum roughened by coarse punctation. Fore wings with vein 1st m-cu meeting second submarginal cell at middle of cell. *Metasoma*: Metasomal terga smooth and shiny; T<sub>1</sub> with PP  $\phi$  20 $\mu$ , IS = 1-2; T<sub>2-4</sub> with PP  $\phi$  20 $\mu$ , IS = 1, sparser and smaller at apical areas; posterior depressions of terga not well indicated. S<sub>2-5</sub> finely tessellate, feebly shiny with obscure PP; S<sub>6</sub> emarginate apically, weakly reflected. Genitalia and associate structures as illustrated (Figs. 9-13).

Specimens *examined*: [Cheju Is.] 8 females, 1 male (O. Tadauchi) and 1 male (J.-c. Paik), Pijarim Forests, Pukcheju-gun, 24. iv. 1997; 10 females, Schwa Beach.



Pukcheju-gun, 25. iv. 1997 (O. Tadauchi); 14 females (O. Tadauchi) and 10 females (J-c. Paik), Mt. Halla, 300 m, Haean-dong, 26. iv. 1997.

**Floral records** (Korea): *Brassica campestris*, *Sagina japonica*.

**Distribution:** Korea (Cheju Is., southern and central Korea).

### 7. *Andrena (Micrandrena) hikosana* Hirashima

*Andrena (Micrandrena) hikosana* Hirashima, 1957, Mushi, 30: 53 [female, Japan]; Hirashima, 1965, J. Fac. Agr., Kyushu Univ., 13: 462-464 [male, redescription of female, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 95, 117 [female, male, in key]; Kim & Kim, 1983, Kor. J. Ent., 13: 7 [Korea]; Tadauchi, 1985, J. Fac. Agr., Kyushu Univ., 30: 60 [biology, in key]; Tadauchi, 1988, Bull. Nagasaki biol. Soc., (33): 5 [Tshishima Is., Japan]; Tadauchi, 1989, Check List Jap. Insects, 684 [in list]; Tadauchi & Lee, 1992, Esakia, (32): 52 [Korea]; Shin et al., 1994, Check List Insects Kor., 266 [in list]; Osytshnjuk, 1995, Key Insects Russian Far East, vol. IV. Part 1, 495, 498, 519 [female, male, in key, Russian Far East].

**Specimen examined:** [Cheju Is.] 1 female, High Resting Area, 1100 m, Mt. Halla, 26. iv. 1997 (J-c. Paik).

**Floral record** (Korea): *Forsythia suspensa*.

**Distribution:** Korea (Cheju Is.: new record, southern and central Korea); Japan (Hokkaido, Honshu, Sado Is., Shikoku, Kyushu, Tsushima Is.); Russia (Far East area).

### 8. *Andrena (Micrandrena) komachi* Hirashima

*Andrena (Micrandrena) komachi* Hirashima, 1965, J. Fac. Agr., Kyushu Univ., 13: 469-471 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 94, 117 [female, male, in key]; Tadauchi, 1985, J. Fac. Agr., Kyushu Univ., 30: 63-65 [biology, in key]; Tadauchi, 1988, Bull. Nagasaki biol. Soc., (33): 5-6 [Tshishima Is., Japan]; Tadauchi, 1989, Check List Jap. Insects. 684 [in list].

**Specimens examined:** [Cheju Is.] 1 female, 9 males, Sanisu-dong, Namjeju-gun, 23. iv. 1997 (O. Tadauchi); 1 female, 1 male, Kwangpyong-ri, Namjeju-gun, 23. iv. 1997 (O. Tadauchi); 2 females, 2 males (J-c. Paik) and 1 female, 7 males (O. Tadauchi). Pijarim Forests, Pukcheju-gun, 24. iv. 1997; 8 females (O. Tadauchi) and 1 male (J-c. Paik), Mt. Halla, 550 m, Haean-dong, 26. iv. 1997 (O. Tadauchi); 1 male, High Resting Area, 1100m, Mt. Halla, 26. iv. 1997 (O. Tadauchi).

**Floral records** (Korea): *Duchesnea chrysantha*, *Brassica campestris*.

**Distribution:** Korea (new record: Cheju Is.), Japan (Hokkaido, Honshu, Sado Is., Kyushu, Tsushima Is.).

9. *Andrena (Micrandrena) munakatai* Tadauchi

*Andrena (Micrandrena) munakatai* Tadauchi, 1985, J. Fac. Agr., Kyushu Univ., 30: 70-73 [female & male, Japan]; Tadauchi, 1989, Check List Jap. Insects, 684 [in list]; Tadauchi & Lee, 1992, Esakia, (32): 53 [Korea].

*Specimens examined*: [Cheju Is.] 1 male, Mt. Komunorum, Pukcheju-gun, 22. iv. 1997 (O. Tadauchi); 5 males, Pijarim Forests, Pukcheju-gun, 24. iv. 1997 (J-c. Paik); 2 females, 1 male (O. Tadauchi) and 1 female (J-c. Paik), Mt. Halla, 550 m, Haean-dong, 26. iv. 1997; 2 females, 1 male, High Resting Area, 1 100m, Mt. Halla, 26. iv. 1997 (O. Tadauchi).

*Floral records* (Korea): *Brassicu cumpestris*, *Duchesneu chrysantha*, *Taraxacum* sp.

*Distribution*: Korea (Cheju Is.: new record, southern Korea); Japan (Hokkaido, Honshu).

10. *Andrena (Plastandrena) magnipunctata* Kim et Kim

(Figs. 14-17)

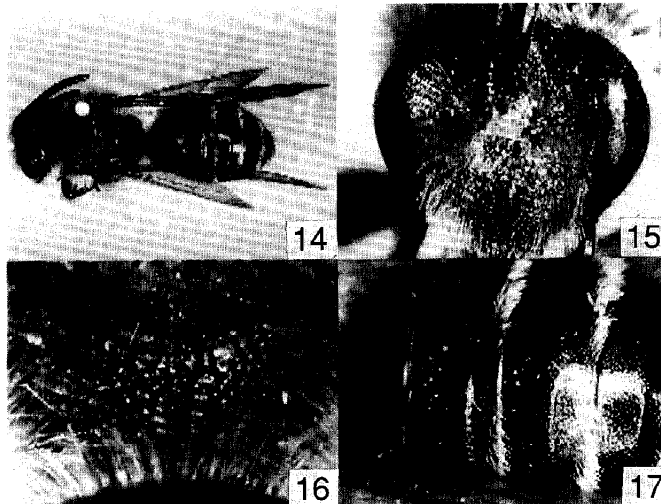
*Andrena (Plastandrena) magnipunctata* Kim & Kim, 1989, Kor. J. Ent., 19: 201-202 [female, Korea]; Shin et al., 1994, Check List Insects Kor., 266 [in list].

Male (new to science): BL 9.8mm, WL 8.7mm (n=1).

*Color*: Flagellum black beneath; mandible with apical third reddened; wing membrane subhyaline, slightly brown; veins and pterostigma reddish brown; tibial spurs reddish yellow; posterior depressions of metasomal terga black.

*Pubescence*: Hairs on head and thorax dense, fulvous; hairs on clypeus 500 $\mu$ , dense; those on vertex 700 $\mu$ , paler, those on genal area long, dense posteriorly. Hairs on mesoscutum and scutellum 500-700 $\mu$ , those on propodeum and mesepisternum 750-1000 $\mu$ ; those on legs yellowish. Hairs on metasomal terga whitish; those on T<sub>1</sub> long 500 $\mu$ ; those on T<sub>2-3</sub> 200-300 $\mu$ , short; T<sub>2-4</sub> with complete, dense whitish hair bands apically; those on T<sub>3-5</sub> with rather short, brownish hairs; S<sub>2-5</sub> with short, dense, yellowish hairs, subapical area with weak, not well-formed fimbriae.

*Structure*: Head: HL / HW = 0.82. HW : MsW : MtW = 3.2 : 3.2 : 3.2. Vertex weakly tessellate with close PP, shagreening medially. OOD : POD : OCD = 0.7 : 0.4 : 0.2. FL<sub>1</sub> = FL<sub>2</sub>, FL<sub>2</sub> slightly shorter than FL<sub>3</sub>. Eyes with inner margins converging toward mandibles. Face above antennal fossae with longitudinal striae and interrugal space with coarse PP. Supraclypeal area shagreening by dull punctation. Facial quadrangle quadrate (about 2.2 : 2.2). Clypeus slightly convex, surface weakly tessellate, weakly shiny with crowded PP $\phi$  20 $\mu$ , IS < 0.1, smaller at extreme angle area, CPL = 1.0 mm. Process of labrum trapezoidal, surface with weak transverse rugulae, deeply emarginate apically. Malar space linear. Lower paraocular area sculptured as in clypeus. Genal area about equal to eye, GW : EW = 0.9 : 0.9, surface weakly tessellate posteriorly, smooth and shiny with PP $\phi$  20 $\mu$ , IS < 0.5 near eye. *Mesosomu*: Pronotum weakly tessellate and shiny with PP. Mesoscutum weakly tessellate and feebly shiny, surface with PP $\phi$  20-40 $\mu$ , IS < 0.1. Scutellum roughened posteriorly, weakly tessellate and shiny with large PP $\phi$  40-60 $\mu$ , IS < 0.1. Propodeal enclosure coarsely wrinkled all over with a carina



**Figs. 14-17.** *Andrena (Plastandrena) magnipunctata* Kim et Kim, 14: dorsal view of the whole body; 15: head in frontal view; 16: propodeum; 17: metasomal terga.

posteriorly; dorsal face roughened with coarse PP. Mesepisternum strongly roughened with coarse PP. Fore wing with vein 1st m-cu meeting 2nd submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga smooth and shiny, T<sub>1</sub> with sparse PP  $\phi$  20 $\mu$ , IS = 1 at basal area, denser at apical area, T<sub>2-4</sub> with close PP  $\phi$  10-20 $\mu$ , IS < 0.5: posterior depressions of terga well indicated. S<sub>2-5</sub> with close PP  $\phi$  20 $\mu$ , IS < 0.5, weakly tessellate and shiny; S<sub>6</sub> flat with tip emarginate.

*Specimen examined*: [Cheju Is.] 1 male, Pijarim Forests, Pukcheju-gun, 24. iv. 1997 (O. Tadauchi).

*Remarks*: This species is similar to *Andrena transbaicalica* Popov (= *astragalina* Hirashima), but is different from *transbaicalica* by the process of labrum deeply emarginate and the mesoscutum and metasomal terga densely punctate in male.

*Floral record* (Korea): *Brassica campestris*.

*Distribution*: Korea (Cheju Is., central Korea).

#### 11. *Andrena (Poecilandrena) fukuokensis* Hirashima

*Andrena (Micrandrena) fukuokensis* Hirashima, 1952a, Mushi, 23: 39 [female & male, Japan].

*Andrena (Poecilandrena) fukuokensis*: Hirashima, 1965, J. Fac. Agr., Kyushu Univ., 13: 494-497 [female & male, redescription]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 99, 112-113 [female, male, in key]; Kim & Kim, 1983, Kor. J. Ent., 13: 6 [Korea]; Tadauchi, 1988, Bull. Nagasaki biol. Soc., (33): 7 [Tsushima

Is., Japan] ; Tadauchi, 1989, Check List Jap. Insects, 68.5 [in list]; Shin *et al.*, 1994, Check List Insects Kor., 266 [in list].

Specimens **examined**: [Cheju Is.] Imale, Mt. Kornunorum, Pukcheju-gun, 22. iv. 1997 (0. Tadauchi); 1 female, Sanisu-dong, Namjeju-gun, 23. iv. 1997 (0. Tadauchi); 5 females, Chonjiyen Waterfall, Sogwipo-shi, 25. iv. 1997 (0. Tadauchi).

*Floral records* (Korea): *Duchesnea chrysantha*, *Brassica campestris*.

*Distribution*: Korea (Cheju Is.: new record, central Korea); Japan (Honshu, Shikoku, Kyushu, Tsushima Is.).

## 12. *Andrena (Simandrena) kerriae* Hirashima

*Andrena (Simandrena) kerriae* Hirashima, 1965, J. Fac. Agr., Kyushu Univ., 13: 499-500 [female, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 106 [female, in key]; Tadauchi & Hirashima, 1983, Esakia, (20): 87-89 [male, Japan]; Tadauchi, 1988, Bull. Nagasaki biol. Soc., (33): 5 [Tsushima Is., Japan]; Tadauchi, 1989, Check List Jap. Insects, 685 [in list]; Tadauchi & Lee, 1992, Esakia, (32): 51 [Korea]; Tadauchi & Xu, 1995, Esakia, (35): 217 [China, Korea]; Osytsnjuk, 1995, Key Insects of Russian Far East vol. IV. Part 1. 508. 524 [female, male, in key, Russian Far East].

Specimens **examined**: [Cheju Is.] 2 females, Kwangpyong-ri, Namjeju-gun. 23. iv. 1997 (0. Tadauchi); 7 females (0. Tadauchi) and 2 females (J-c. Paik), Mt. Halla, 300-550 m, Haean-dong, 26. iv. 1997 (0. Tadauchi).

*Floral records* (Korea): *Brassica campestris*, *Sagina japonica*, *Rhododendron* sp., *Duchesnea chrysantha*.

*Distribution*: Korea (Cheju Is.: new record, southern and central Korea); Japan (Hokkaido, Honshu, Sado Is., Shikoku, Kyushu, Tsushima Is.); China (Beijing, Heilongjiang Prov.); Russia (Far East area).

## 13. *Andrena (Trachandrena) haemorrhoea japonibia* Hirashima

*Andrena (Trachandrena) haemorrhoea japonibia* Hirashima, 1957, Mushi, 30: 53-54 [female & male, Japan]; Hirashima, 1965, J. Fac. Agr., Kyushu Univ., 13: 513-515 [female & male, redescription]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 96, 116 [female, male, in key]; Tadauchi, 1988, Bull. Nagasaki biol. Soc., (33): 8 [Tsushima Is., Japan] ; Tadauchi, 1989, Check List Jap. Insects, 685 [in list]; Tadauchi & Lee, 1992, Esakia, (32): 56 [Korea].

*Andrena (Taenandrena) haemorrhoea japonibia*: Shin *et al.*, 1994, Check List Insects Kor., 266 [in list].

Specimens **examined**: [Cheju Is.] 4 females, Sanisu-dong, Namjeju-gun, 23. iv. 1997 (0. Tadauchi); 6 females (J-c. Paik) and 4 females (0. Tadauchi), Mt. Halla, 300 m, Haean-dong, 26. iv. 1997.

*Floral records* (Korea): *Brassica campestris*, *Duchesnea chrysantha*.

*Distribution*: Korea (Cheju Is.: new record, southern and central Korea); Japan (Hokkaido, Honshu, Shikoku, Kyushu, Tsushima Is.).

## II. New records of the genus *Andrena* from Korea

We found 4 more species in the collection of Kyushu University, which are newly recorded from Korea. Table 1 shows a list of Korean species with distribution in Korea and Japan. A total of 52 species are listed including records in the literature. Some of the species in the list need to be re-examined. Of the 52 species found in Korea, 39 species (75.0%) occur also in Japan, 6 (11.5%) are found only in Korea at present and 7 are recorded in China and/or the Russian Far East.

Tadauchi and Xu are presently working on a revisional study of East Asian *Andrena*. The results of this biogeographical/distributional study will be discussed at a later date.

### 14. *Andrena* (*Chlorandrena*) *taraxaci chikuzenensis* Hirashima

*Andrena* (*Chlorandrena*) *taraxaci chikuzenensis* Hirashima, 1957, Mushi, 30: 52 [female & male, Japan]; Hirashima, 1963, J. Fac. Agr., Kyushu Univ., 12: 255-258 [female & male, redescription]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 97, 118 [female, male, in key]; Tadauchi, 1988, Bull. Nagasaki biol. Soc., (33): 8 [Tsushima Is., Japan]; Tadauchi, 1989, Check List Jap. Insects. 683 [in list].

*Specimens examined*: 1 female, Seishin (=Cheongjin), N. Korea, 19. vii. 1938 (S. Kumashiro); 2 females, 1 male, Koryo (=Kwangneung), Korea, 9. v. 1937 (T. Kusanagi).

*Floral record* (Korea): Not available.

*Distribution*: Korea (new record: Seishin, north Korea; Koryo, central Korea); Japan (Honshu, Shikoku, Kyushu, Tsushima Is.).

### 15. *Andrena* (*Lepidandrena*) *chengtehensis* Yasumatsu

*Andrena* (*Poecilandrena*) *chengtehensis* Yasumatsu, 1935, Insects Jehol, 8: 38-40 [male, China]; Yasumatsu, 1941, Peking nat. Hist. Bull., 15: 274 [in list].

*Andrena* (*Lepidandrena*) *Zebedevi* Popov, 1940, Trav. Inst. Zool. Acad. Sci. URSS, 6: 253-254 [female, China]. new **synonymy**

*Andrena lebedevi*: Wu, 1965, Economic Insects China XI, Apoidea, 30-3 1 [China].

*Specimen examined*: [Korea] 1 female, Suigen (=Suwon), Korea. 30. viii. 1923 (K. Sato).

*Remarks*: We examined Chinese specimens of *Andrena lebedevi* and the type of *Andrena chengtehensis* Yasumatsu, which is preserved in the National Science Museum in Tokyo and recognized *A. lebedevi* as a new synonym of *A. chengtehensis*.

*Floral record* (Korea): Not available.

Distribution: Korea (new record: Suigen, central Korea); China (Hebei, Inner Mongolia, Shandong, Jiangsu, Anhui Provs.).

**16. *Andrena (Oreomelissa) amurensis* Friese**

*Andrena amurensis* Friese, 1922, Konowia, 1: 212 [female & male. Amur]; Yasumatsu. 1941, Peking nat. Hist. Bull. 15: 273 [in list].

*Andrena (Oreomelissa) amurensis*: Osytshnjuk, 1995, Key Insects Russian Far East vol. IV. Part 1, 494, 5 17 [female, male, in key, Russian Far East].

*Andrena (Oreomelissa) mitakensis*: Hirashima & Tadauchi, 1975, J. Fac. Agr., Kyushu Univ., 19: 178-179 [in part, Korea].

The following redescription is based on our specimen:

**Female:** BL 10 mm, WL 9.0 mm ( $n=1$ ).

*Color:* Flagellum reddish brown beneath; mandible with apical third reddened; wing membrane subhyaline, moderately brown; veins and pterostigma reddish brown; tibial spurs reddish; posterior depressions of metasomal terga yellowish brown translucent.

*Pubescence:* Hairs on head short, sparse; those on clypeus 200-500 $\mu$ , rather sparse. brown; those on antennal area short, sparse, whitish; those on vertex 180 $\mu$ , black; those on genal area whitish; facial fovea brown. Hairs on mesoscutum 300-500 $\mu$ , whitish mixed with brown; those on scutellum dense, whitish posteriorly: those on mesepisternum long and sparse, whitish; propodeal corbicula poor with sparse dorsal fringes, with internal simple dull whitish hairs; trochanteral floccus perfect, dull whitish. femoral floccus sparse, tibialscopa more or less loose, composed of long, dark brown simple hairs. Hairs on metasomal terga scanty; T<sub>2-4</sub> with well-formed apical white hair bands, interrupted on T<sub>2</sub>; caudal fimbria brown; S<sub>2-5</sub> with subapical fimbriae, yellowish.

*Structure:* Head: HL / HW = 0.91. HW : MsW : MtW = 3.0 : 3.0 : 3.0. Vertex strongly roughened by deep, coarse punctation. OOD : POD : OCD = 0.55 : 0.3 : 0.25. FL<sub>1</sub> = FL<sub>2+3</sub>, FL<sub>1</sub> = FL<sub>3</sub>, FL<sub>2</sub> with longer than broad. Eyes with inner margins subparallel. Facial fovea deep, extending a line running between lower margins of antennal fossae, separated from inner margin of eye by smooth punctate space, FVL = 1.2 mm, FVW = 0.3 mm. Facial quadrangle slightly longer than broad, (about 2.1 : 1.9). Face above antennal fossae strongly roughened with slanting rugulae, interrugal space with coarse PP. Clypeus slightly convex, weakly tessellate and shiny, surface with rather crowded PP, IS < 0.3, CPL = 1.0 mm. Process of labrum small, short and triangular. Lower paraocular area sculptured as in clypeus. Malar space linear. Genal area narrower than eye, GW : EW = 0.6 : 0.88, surface weakly tessellate posteriorly. coarsely punctate near eye. Mesosoma: Pronotum with weak humeral angle, without dorsoventral ridge. surface weakly tessellate with crowded PP. Mesoscutum and scutellum finely tessellate with PP $\phi$  20 $\mu$ , IS = 0.5-1, denser posteriorly. Propodeal enclosure weakly rugulose at basal half, finely tessellate at apical half; dorsal face of propodeum finely tessellate and feebly shiny with shallow PP. Mesepisternum densely tessellate above. weakly tessellate and shiny below. Middle basitarsi normal. Metasoma: Metasomal terga smooth to weakly tessellate, shiny; T<sub>1</sub> with minute PP, irregular in distribution; T<sub>2-4</sub> with close PP $\phi$  10-20

**Table 1.** A list of Korean species of the genus *Andrena* with distribution in Korea and Japan.

species	Korea		Japan					
	Kor.	Pen.	Cheju Is.	Tshushima	Kyushu	Shikoku	Honshu	Hokkaido
1. A. ( <i>Andrena</i> ) <i>benefica</i>	●		●		●	●	●	●
2. A. ( <i>Andrena</i> ) <i>brevihirtiscopa</i>	●				●		●	●
3. A. ( <i>Andrena</i> ) <i>dolharubang</i>			●					
4. A. ( <i>Andrena</i> ) <i>hondoica</i>	●						●	●
5. A. ( <i>Andrena</i> ) <i>ishiharai</i>	●					●	●	●
6. A. ( <i>Andrena</i> ) <i>kyusani</i>	●							
7. A. ( <i>Andrena</i> ) <i>longitibialis</i>	●				●	●	●	●
8. A. ( <i>Andrena</i> ) <i>mikado</i>	●		●	●	●	●	●	
9. A. ( <i>Andrena</i> ) <i>sakagami</i>	●						●	●
10. A. ( <i>Calomelissa</i> ) <i>prostomias</i>			●		●	●	●	
11. A. ( <i>Calomelissa</i> ) <i>tsukubana</i>	●				●	●	●	
12. A. ( <i>Chlorandrena</i> ) <i>knuthi</i>	●			●	●	●	●	
13. A. ( <i>Chlorandrena</i> ) <i>knuthiformis</i>	●							
14. A. ( <i>Chlorandrena</i> ) <i>okinawana</i>	●			●				
15. A. ( <i>Chlorandrena</i> ) <i>taraxaci chikuzenensis</i>	●			●			●	
16. A. ( <i>Cnemidandrena</i> ) <i>denticulata seneciorum</i>	●	●			●		●	●
17. A. ( <i>Euandrena</i> ) <i>plumosa</i>	●							
18. A. ( <i>Euandrena</i> ) <i>ruficrus rabricus</i>	●						●	●
19. A. ( <i>Euandrena</i> ) <i>sterallia</i>	●			●	●	●	●	●
20. A. ( <i>Holandrena</i> ) <i>medicinalens</i>	●							
21. A. ( <i>Holandrena</i> ) <i>valeriana</i>	●		●	●	●		●	●
22. A. ( <i>Hoplandrena</i> ) <i>dentata</i>	●		●	●	●	●	●	●
23. A. ( <i>Hoplandrena</i> ) <i>miyamotoi</i>	●				●	●	●	
24. A. ( <i>Hoplandrena</i> ) <i>pruniphora</i>	●					●	●	
25. A. ( <i>Hoplandrena</i> ) <i>rosae alfkeni</i>	●							●
26. A. ( <i>Lepidandrena</i> ) <i>chengtehensis</i>	●							
27. A. ( <i>Leucandrena</i> ) <i>delicatula</i>	●		●					
28. A. ( <i>Melandrena</i> ) <i>crassepunctata</i>	●		●					
29. A. ( <i>Melandrena</i> ) <i>koreana</i>	●		●					
30. A. ( <i>Melandrena</i> ) <i>parathoracica</i>	●		●	●	●	●	●	●
31. A. ( <i>Melandrena</i> ) <i>sasaki</i>	●			●	●	●	●	
32. A. ( <i>Melandrena</i> ) <i>thoracica sinensis</i>	●							
33. A. ( <i>Micrandrena</i> ) <i>brassicae</i>	●			●	●	●	●	●
34. A. ( <i>Micrandrena</i> ) <i>chirisana</i>	●							
35. A. ( <i>Micrandrena</i> ) <i>hikosana</i>	●		●	●	●	●	●	●
36. A. ( <i>Micrandrena</i> ) <i>kaguya</i>	●				●	●	●	●
37. A. ( <i>Micrandrena</i> ) <i>komachi</i>	●			●	●	●	●	●
38. A. ( <i>Micrandrena</i> ) <i>munakatai</i>	●		●				●	●
39. A. ( <i>Micrandrena</i> ) <i>sublevigata</i>	●				●	●	●	●
40. A. ( <i>Notandrena</i> ) <i>richardsi</i>	●				●	●	●	●
41. A. ( <i>Mitsukurieiella</i> ) <i>japonica</i>	●				●	●	●	
42. A. ( <i>Oreomelissa</i> ) <i>amurensis</i>	●							
43. A. ( <i>Oreomelissa</i> ) <i>kamikochiana</i>	●						●	
44. A. ( <i>Plastandrena</i> ) <i>magnipunctata</i>	●		●					
45. A. ( <i>Plastandrena</i> ) <i>transbaicalica</i>	●						●	●
46. A. ( <i>Poecilandrena</i> ) <i>fukuokensis</i>	●		●	●	●	●	●	
47. A. ( <i>Simandrena</i> ) <i>kerriae</i>	●		●	●	●	●	●	●
48. A. ( <i>Simandrena</i> ) <i>yamato</i>	●		●	●	●	●	●	●
49. A. ( <i>Stenomelissa</i> ) <i>halictoides</i>	●						●	●
50. A. ( <i>Taenandrena</i> ) <i>ezoensis</i>	●		●				●	●
51. A. ( <i>Trachandrena</i> ) <i>foveopunctata</i>	●		●	●	●	●	●	●
52. A. ( <i>Trachandrena</i> ) <i>haemorrhoea japonibia</i>	●	●	●	●	●	●	●	●

$\mu$ , IS = 0.5-1; posterior depressions of terga not well indicated. Pygidial plate U-shaped with weak internal triangular area. S<sub>2-5</sub> finely tessellate, impunctate apically.

*Specimens examined*: [Korea] 1 female, Mt. Kongo, Kogendo, Korea, 10. ix. 193 1 (C. Takeya).

*Remarks*: This species is similar to *Andrena mitakensis* Hirashima, but is different from *mitakensis* by the vertex and face above antennal fossae more strongly roughened. the pronotum with weak humeral angle and the metasomal terga with distinct close PP.

Hirashima and Tadauchi (1975) noticed this specimen was somewhat different from *mitakensis* from Japan. Although Xu and Tadauchi (1996) studied Friese's *Andrenu* types preserved in the Berlin Zoological Museum, we could not find the type of *Andrenu amurensis* Friese, 1922 in the loan. Osytshnjuk (1995) treated *amurensis* in the key of Russian Far East with figures of the whole body, the process of labrum and the male genitalia. We identify this specimen with *amurensis* in the present study.

Distribution: Korea (new record: Mt. Kongo, north Korea); Russia (Far East area).

Floral record (Korea): Not available.

#### 17. *Andrena (Oreomelissa) kamikochiana* Hirashima

*Andrenu (Calomelissa) kumikochiunu* Hirashima, 1963, J. Fac. Agr., Kyushu Univ.. 12: 251-255 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ.. 14: 112, 113 [female, male, in key].

*Andrenu (Oreomelissa) kumikochiunu*: Hirashima & Tadauchi, 1975, J. Fac. Agr., Kyushu Univ., 19: 179-180 [Japan]; Tadauchi, 1989, Check List Jap. Insects, 684 [in list].

*Specimen examined*: [Korea] 1 female, Mt. Kongo, Korea, 18. viii. 1940. (T. Shirozu).

Floral record (Korea): Not available.

Distribution: Korea (new record: Mt. Kongo, north Korea); Japan (Honshu).

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