A Revision of the Subgenus Hoplandrena of the Genus Andrena of Eastern Asia (Hymenoptera, Andrenidae)

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A Revision of the Subgenus *Hoplandrena* of the Genus *Andrena* of Eastern Asia (Hymenoptera, Andrenidae)[1), 2), 3)]

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Abstract. The subgenus *Hoplandrena* of the genus *Andrena* of eastern Asia is revised, and 11 species are recorded. Three new species, *Andrena* (*Hoplandrena*) *xiyuensis, A.* (*H.*) *tibetica, A.* (*H.*) *fagopyri* are described from China. *Andrena* (*Hoplandrena*) *rosae alfkeni* is recorded from China for the first time. *A.* (*Hoplandrena*) *pruniphora* Hirashima is synonymized with *Andrena* (*Chlorandrena*) *nudigastra nudigastroides* Yasumatsu, which is raised to *Andrena* (*Hoplandrena*) *nudigastroides.* A key to East Asian species is presented.

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

Introduction

The palaearctric subgenus *Hoplandrena* Pérez of the genus *Andrena* contains 24 species in

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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. 17.

a catalogue of the world checklist of the genus *Andrena* by Gusenleitner & Schwarz (2002). Ten species were recorded from Europe, 4 from Turkey, 1 from Central Asia and 1 from India. In eastern Asia, Hirashima (1964, 1965), Tadauchi & Hirashima (1984) gave revisions and recorded 6 species in this subgenus from Japan. In China, Xu (1984) described 2 new species and Osytshnjuk (1995) reported one new species from Russian Far East. In the present study, we re-examined all the species of this subgenus from eastern Asia except for *Andrena* (*Hoplandrena*) *romankovae* Osytshnjuk. We examined the type of *Andrena* (*Chlorandrena*) *nudigastra nudigastroides* Yasumatsu from China and recognized it belongs to the subgenus *Hoplandrena*. As a result, we recognized 11 species including 3 new species and 1 new synonymy. The holotype will be preserved in the Institute of Zoology, Academia Sinica, Beijing and paratypes will be in the above institute and the Entomological Laboratoty, Kyushu University.

Subgenus *Hoplandrena* Pérez

Hoplandrena Pérez, 1890, Act. Soc. Linn. Bordeaux, 44: 170; Hedicke, 1933, Mitt. Zool. Mus. Berlin, 19: 214; Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 83-84; Warncke, 1968, Mem. Est. Mus. Zool. Univ. Coimbra, (307): 88-89; Tadauchi & Hirashima, 1984, Kontyû, 52: 278 Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 35. Type species: *Melitta trimmerana* Kirby, 1802 (designated by Pérez, 1890).

Diagnosis: Medium-sized to large bees; facial quadrangle usually broader than long or elongate; facial fovea broad; clypeus convex usually with impunctate longitudinal space; process of labrum entire or weakly emarginate apically; subgenal coronet present; maxillary and labial palpus normal; pronotum without humeral angle and ridge; three submarginal cells present; metasomal terga tessellate, usually impunctate (occasionally with weak and sparse punctures in the 2nd generation), terga with or without apical hair bands. Male clypeus black; malar space evident, with strong to weak spine or angle; genal area broad, angulate or rounded posteriorly; sterna with incomplete subapical fimbriae.

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

Female

1. Metasomal terga 1-3 ferruginous in part and weakly tessellate; [metasomal tergum 2 without hair band] ..... *rosae alfkeni* Friese
   —Metasomal terga black or narrowly red to yellow in part and densely tessellate 2
2. Metasomal terga without apical hair bands 3
   —Metasomal terga 2-4 with apical hair bands 4

3. Clypeus finely tessellate with small punctures; process of labrum nearly entire; malar space long, about a half width of basal mandible; mesoscutum finely granulate with obscure punctures; propodeum finely tessellate, unshagreened ..... *xiyuensis* n. sp.
— Clypeus smooth and shiny with moderate punctures; process of labrum deeply emarginate; mesoscutum broadly shiny with fine punctures; propodeum densely tessellate, shagreened ..... *macrocephalata* Xu
4. First flagellar segment longer than flagellar segment 2 plus 3; metasomal terga 2-4 with long hairs; labrum apical to process weakly sulcate 5
— First flagellar segment shorter than or as long as flagellar segment 2 plus 3; metasomal terga 2-4 without long hairs; labrum apical to process deeply sulcate 6
5. Metasomal terga densely tessellate; clypeus sparsely punctate with moderate punctures, median impunctate space distinct, surface weakly tessellate, shiny ..... *tibetica* n. sp.
— Metasomal terga weakly tessellate, broadly shiny; clypeus coarsely punctate with large punctures, median impunctate space indistinct ..... *fagopyri* n. sp.
6. Pronotum emarginated in the middle; pronotum with median longitudinal line; [process of labrum entire; metasomal terga strongly tessellate; hairs on mesoscutum fulvous] ..... *akitsushimae* Tadauchi et Hirashima
— Pronotum not emarginated in the middle; pronotum without median longitudinal line 7
7. Mesoscutum with black to blackish hairs, with scattered weak punctures; clypeus less coarsely punctate ..... *miyamotoi* Hirashima
— Mesoscutum with yellow to brown hairs, with fine punctures; clypeus coarsely punctate with median impunctate space 8
8. First flagellar segment as long as FL2+3; process of labrum emarginated in the middle; metasomal terga weakly tessellate ..... *nudigastroides* Yasumatsu
— First flagellar segment shorter than FL2+3; process of labrum entire; metasomal terga rather densely tessellate 9
9. Vertex with brown hairs ..... *dentata* Smith
— Vertex without brown hairs ..... *macroceps* (Matsumura)

Male

1. Malar space with sharp spine posteriorly; mandible long, curved, distinctly falciform 2
— Malar space without spine; mandible not elongate, without falciform apices 9
2. Head large; [mesoscutum and metasomal terga smooth and shiny with distinct punctures] ..... *macrocephalata* Xu
— Head normal 3
3. Metasoma broadly ferruginous; [head with black hairs; mesoscutum with dull white hairs

intermixed with black ones; clypeus smooth and shiny with strong punctures; mesoscutum weakly tessellate with weak, sparse punctures; metasomal terga very weakly tessellate with fine punctures] ..... *rosae alfkeni* Friese, 1st g.

—Metasoma black or with reddened apical portions on 1st to 3rd segments 4

4. Hairs on clypeus black or dull white mixed with brown 5

—Hairs on clypeus dull white to pale yellowish 7

5. Malar space with short spine; [hairs on mesoscutum and mesepisternum dull white, mixed with sparse black ones; clypeus usually densely tessellate apically; vertex just behind ocellar region not convex in frontal view; subapical margin of pronotum not emarginated] ..... *miyamotoi* Hirashima, 1st g.

—Malar space with long spine 6

6. Hairs on mesoscutum and mesepisternum black and dull white; vertex just behind ocellar region convex in frontal view; subapical margin of pronotum emarginated in the middle ..... *akitsushimae* Tadauchi et Hirashima, 1st g.

—Hairs on mesoscutum and mesepisternum pale yellowish; vertex just behind ocellar region not convex in frontal view; subapical margin of pronotum not emarginated in the middle ..... *tibetica* n. sp.

7. Antennae with 2nd flagellar segment nearly as long as 3rd; head and thorax covered with long, rather dense, pale fulvous hairs; malar space with long spine ..... *macroceps* (Matsumura), 1st g.

—Antennae with 2nd flagellar segment longer than 3rd 8

8. Clypeus and thorax covered with dull white hairs; metasomal terga tessellate with indistinct punctures ..... *dentata* Smith, 1st g.

—Clypeus with brownish hairs; thorax covered with pale yellowish hairs; metasomal terga nearly smooth and shiny with fine punctures..... *nudigastroides* Yasumatsu, 1st g.

9. Metasoma black 10

—Metasoma reddened on apical portion of 1st to 3rd segments 12

10. Large species, 12-13 mm; mesoscutum with yellowish hairs, not mixed with black ..... *fagopyri* n. sp.

—Smaller species, 8-9 mm; mesoscutum mixed with black hairs 11

11. Hairs on mesoscutum whitish, intermixed with black ones; clypeus slightly convex, densely tessellate; subapical margin of pronotum not emarginated; metasomal terga tessellate with weak punctures ..... *miyamotoi* Hirashima, 2nd g.

—Hairs on mesoscutum short, black; clypeus strongly convex, smooth and shiny; subapical margin of pronotum emarginated; metasomal terga smooth and shiny with distinct punctures ..... *akitsushimae* Tadauchi et Hirashima, 2nd g.

12. Clypeus strongly convex, smooth and shiny, covered with rather long, dense, blackish hairs ..... *rosae alfkeni* Friese, 2nd g.

—Clypeus well convex, very weakly to weakly tessellate, covered with whitish hairs 13

13. Hairs on mesoscutum whitish, short; metasoma smooth and shiny with dense, distinct punctures ..... *nudigastroides* Yasumatsu, 2nd g.

—Hairs on mesoscutum whitish, long; metasoma densely tessellate with indistinct punctures ..... *dentata* Smith, 2nd g.

1. *Andrena* (*Hoplandrena*) *rosae alfkeni* Friese

Andrena rosae var. *alfkeni* Friese, 1914, Stett. ent. Zeit., 75: 228 [female, M. Siberia]; Yasumatsu, 1941, Peking nat. Hist. Bull., 15: 280 [in list].

Andrena (*Hoplandrena*) *rosae alfkeni*: Osytshnjuk, 1995, Key Insects Russian Far East, Vol. IV. Part 1, 501, 520 [female & male, in key, Russian Far East, Mongolia]; Tadauchi et. al, 1997, Esakia, (37): 200 [in list, Korea]; Tadauchi et al., 2001, Esakia, (41): [in URL].

Andrena florea sachalinensis Yasumatsu, 1930, Ins. Mats., 13: 66 [female, Saghalien]; Kim, 1970, Ill. Encycl. Faun. & Fl. Korea, 11 (3): 658 [Korea].

Andrena (*Hoplandrena*) *sachalinensis*: Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 91-93 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 99, 115 [female & male, in key]; Tadauchi & Hirashima, 1984, Kontyû, 52: 284-285 [in key].

Specimens examined: **CHINA**: Heilongjiang Province: 6 females, Jingpo Lake, Mudanjiang, 23-25. v. 1993 (O. Tadauchi); 1 female, Jalamutu, near Hailaer, 8. vi. 1940 (S. Tagaki). Liaoning Province: 1 male, Kao-lin-tse, 17-21. viii. 1939 (M. Volkoff). Hebei Province: Weichang, 1,500 m, 22. vii. 1985 (X-z. Zhang). **JAPAN**: 1 female, Kussharo-ko, Teshikaga, Hokkaido, 26.v. 1984 (O. Tadauchi).

Remarks: This species is easily recognized by the metasomal terga ferruginous in part, the 2nd metasomal tergum without hair fringe apically, the hairs on supra-antennal area, vertex, genal area above near eyes and mesoscutum nearly fuscous.

Distribution: China (new record, Heilongjiang, Liaoning, Hebei Provs.); Japan (Hokkaido); Korea; Russia (Far East area); Mongolia.

Flight records: Two generations a year. Female: late May to late June (1st g.), early August (2nd g.). Male: late July to late August.

Floral association: Japan: *Taraxacum officinale*, China: *Taraxacum* sp.

2. *Andrena* (*Hoplandrena*) *xiyuensis* n. sp.

(Fig. 1: A-E)

Andrena marmora [*nec* Nurse, 1904]: Wu, 1985, Living Things Tianshan Tomurfeng Region Xinjiang, Apoidea, 138 [in list].

Female: BL 12.0 mm, WL 10.7 mm (n=1).

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

Pubescence: Hairs on head sparse, brown to black; those on clypeus scanty; those on vertex 600-800 μ, brown; those on antennal area and genal area black; facial fovea brown. Hairs on dorsal thorax sparse, whitish to black; those on mesoscutum 400-700 μ, whitish mixed with short black hairs; those on scutellum and metanotum whitish; those on mesepisternum 700-800 μ, dense, black; propodeal corbicula developed, with internal sparse simple hairs; trochanteral floccus imperfect, brown; femoral floccus dense, brown; tibial scopal hairs long, simple, black. Hairs on metasomal terga rather sparse; those on tergum 1 long, whitish; those on terga 2-4 short, brown; caudal fimbria dark brown; terga 2-4 without white hair bands; sterna 2-5 without subapical fimbriae.

Structure: Head: HL/HW =0.78. HW: MsW: MtW =3.8: 3.8: 3.6. Vertex densely tessellate, shagreened. OOD: POD: OCD = 0.8: 0.5 :0.3. FL1 longer than FL2+3, FL2 slightly shorter than FL3, FL3 longer than broad. Eyes with inner margins paralleled. Facial fovea broad above, narrowing toward below, exceeding below a line at lower margin of antennal fossae, FVL = 1.6 mm, FVW = 0.7 mm. Supraclypeal area shagreened by weak rugulae and minute PP. Face above antennal fossae with fine longitudinal rugulae and minute interrugal PP, surface shagreened. Facial quadrangle broader than long (about 2.9: 2.5). Clypeus well convex, densely tessellate, surface weakly and densely punctate with PPø15 μ, IS =0.5-1, with indistinct median longitudinal impunctate line above, CPL = 1.2 mm. Process of labrum large, trapezoidal, weakly emarginate apically. Labrum apical to process not sulcate, without median crista. Lower paraocular area as in clypeus, but PP smaller. Malar space distinct, about one half as long as width of basal mandible. Genal area broader than eye, GW: EW = 0.9: 0.8, surface broadly densely tessellate, narrowly shiny with microscopic PP near eye. *Mesosoma*: Pronotum reticularly shagreened. Mesoscutum and scutellum finely tessellate with sparse obscure minute PP. Propodeal enclosure tessellate all over; dorsal face of propodeum densely tessellate with weak PP. Mesepisternum densely tessellate, shagreened medially. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. *Metasoma*: metasomal terga weakly tessellate, moderately shiny, scattered obscure microscopic PP; posterior depressions of terga broad, not well indicated; pygidial plate V-shaped without raised triangular area. Sterna 2-5

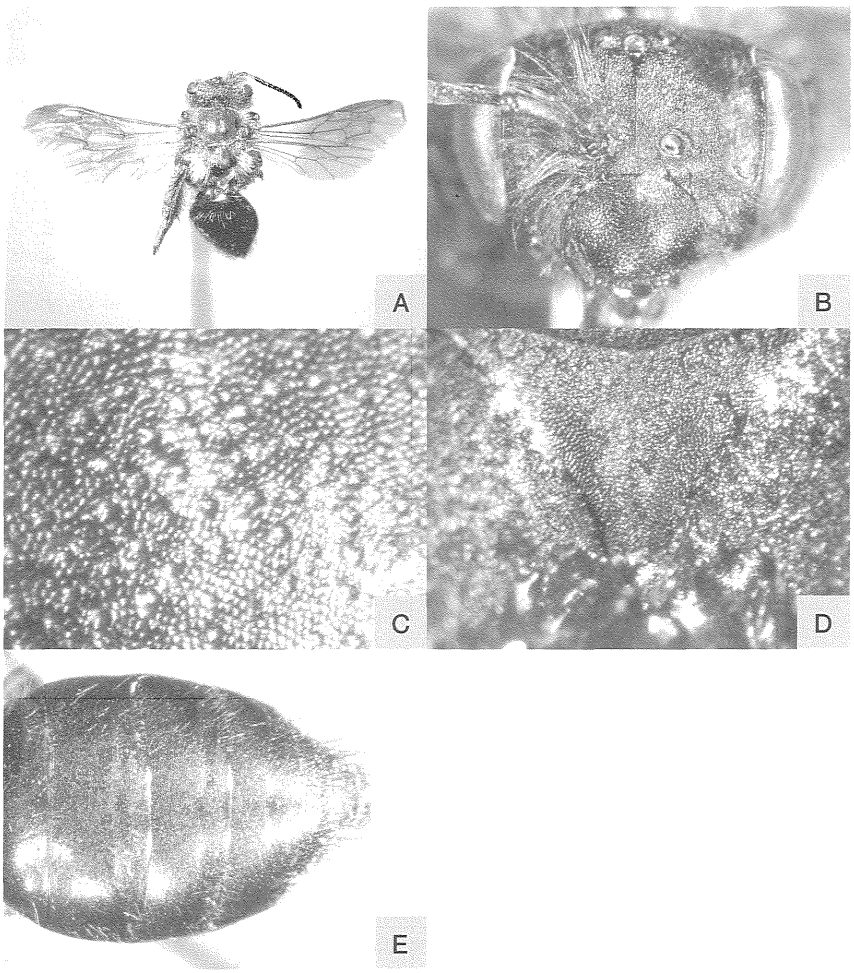

Fig. 1. A-E. *Andrena* (*Hoplandrena*) *xiyuensis* n. sp. Female A: general habitus; B: head in frontal view C: mesoscutum; D: propodeum; E: metasomal terga.

finely to weakly tessellate, impunctate apically, broadly finely punctate basally.

Male: Unknown.

Type material: Holotype female, Baicheng, 2,300 m, Xinjiang Uygur Autn. Region, China, 6. vi. 1978 (Y-h. Han).

Remarks: The female of this species is close to *Andrena* (*Hoplandrena*) *macrocephalata* Xu, but can be separable from the latter by the clypeus densely tessellate except apical area, with weak median impunctate line at upper half, the mesoscutum weakly tessellate medially, and the metasomal terga with indistinct punctures. It is somewhat similar to *Andrena nuptialis* Pérez and *Andrena clusia* Warncke by the first flagellar segment longer than flagellar segment

2 plus 3, but it can be separated from the latter two species by the combination of the following character states; the clypeus with weak impunctate line at upper half, the metasomal terga without long hairs and apical hair bands, the pygidial plate without raised internal triangular area. Wu (1985) recorded this specimen as *Andrena marmora,* but *marmora* Nurse belongs to the subgenus *Melandrena.*

Distribution: China (Xinjiang Uygur Auton. Region).

Flight record: Female: early June.

Floral association: Not available.

Etymology: The specific name, *xiyuensis*, is derived from "Xiyu" which is an ancient name of the type locality Xinjiang, meaning "West Region" in ancient China.

3. *Andrena* (*Hoplandrena*) *macrocephalata* Xu

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

Andrena (*Hoplandrena*) *macrocephalata* Xu, 1994, Sinozoologia, (11): 200 [female & male, China].

Type specimens examined: Paratypes (Institute of Zoology, Academia Sinica), Taigu, Shanxi Province, China, 1 female and 1 male , 16. ix. 1953, 1 female, 24. ix. 1953. Other material: 2 males, same locality as the paratypes, 17. ix. 1953. Hebei Province: 1 female, Xiaowutaishan, 1200 m, 2. ix. 1964 (C-g. Wang). Wei County: 1 female and 1 male, Xiheyin, 860 m, 9. ix. 1964 (Y-h. Han). Gansu Province: 1 male, Jiuquan City, 1400 m, 25. viii. 1957 (Y-r. Zhang).

Remarks: This is a unique species and is easily recognized in male by the large head, the longer first flagellar segments, the mesoscutum and metasomal terga smooth and shiny with distinct punctures. The female of this species is recognized by the head and mesepisternum with black hairs, the mesoscutum smooth and shiny, and the metasomal terga without long hairs and apical hair bands. It is notable that males collected in August to September have short spines on the malar space as in the spring form of the other species in the subgenus.

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

Flight records: Female: early to late September. Male: late August to mid September.

Floral association: Not available.

4. *Andrena* (*Hoplandrena*) *tibetica* n. sp.

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

Andrena (*Holandrena*) *mediocalens* [*nec* Cockerell]: Wu, 1982, Insects Xizang, Vol. 2. 392, in part.

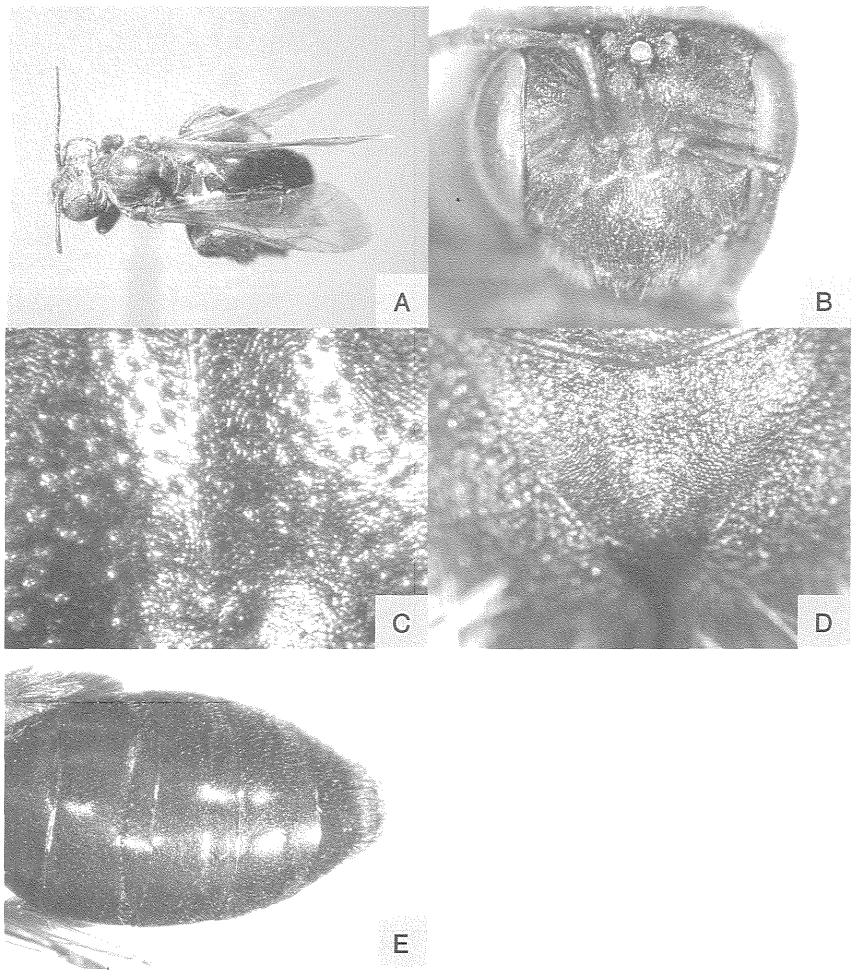

Fig. 2. A-E. *Andrena* (*Hoplandrena*) *macrocephalata* Xu. Female A: general habitus; B: head in frontal view C: mesoscutum; D: propodeum; E: metasomal terga.

Female: BL 13.5-16.5 mm, WL 11.5-12.0 mm (n=3).

Color: Flagellum reddish yellow beneath except at base; mandible with apical half reddened; wing membranes yellowish brown at base, paler apically, veins and pterostigma deep reddish brown; tibial spurs yellow; posterior depressions of metasomal terga reddish brown subhyaline.

Pubescence: Hairs on head brownish yellow to black; those on clypeus 300-400 μ, sparse, brownish yellow; those on antennal area brownish yellow mixed with black; those on face above clypeus black; those on vertex 400-700 μ, dense, black; those on genal area yellow; facial fovea brown above, yellowish below. Hairs on thorax dense, yellow, darker on

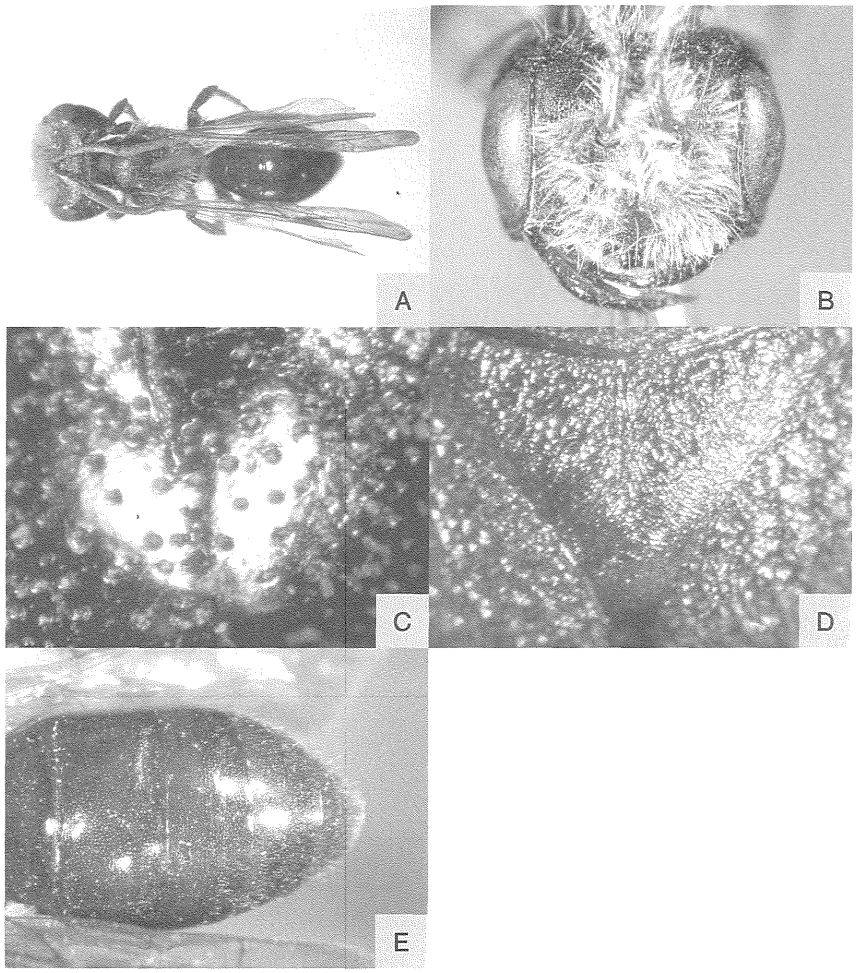

Fig. 3. A-E. *Andrena* (*Hoplandrena*) *macrocephalata* Xu. Male A: general habitus; B: head in frontal view C: mesoscutum; D: propodeum; E: metasomal terga.

mesoscutum; those on mesoscutum 700-800 μ, fulvous; those on scutellum and metanotum yellow; those on mesepisternum longest, pale yellow; propodeal corbicula developed, with internal sparse simple hairs; trochanteral floccus imperfect; femoral floccus dense, whitish; tibial scopal hairs long, simple, brown. Hairs on metasomal terga more or less dense; those on tergum 1 erect, long, yellowish; those on tergum 2 long, yellow mixed with brown; those on terga 3-4 short, brown; terga 2-4 with narrow white hair bands; caudal fimbria black; sterna 2-5 with incomplete long white to brown subapical fimbriae.

Structure: Head: HL/HW =0.8. HW: MsW: MtW = 4.1: 4.1: 4.5. Vertex densely tessellate, shagreened by coarse minute PP. OOD: POD: OCD = 0.9: 0.5: 0.4. FL1 > FL2+3, FL2 =

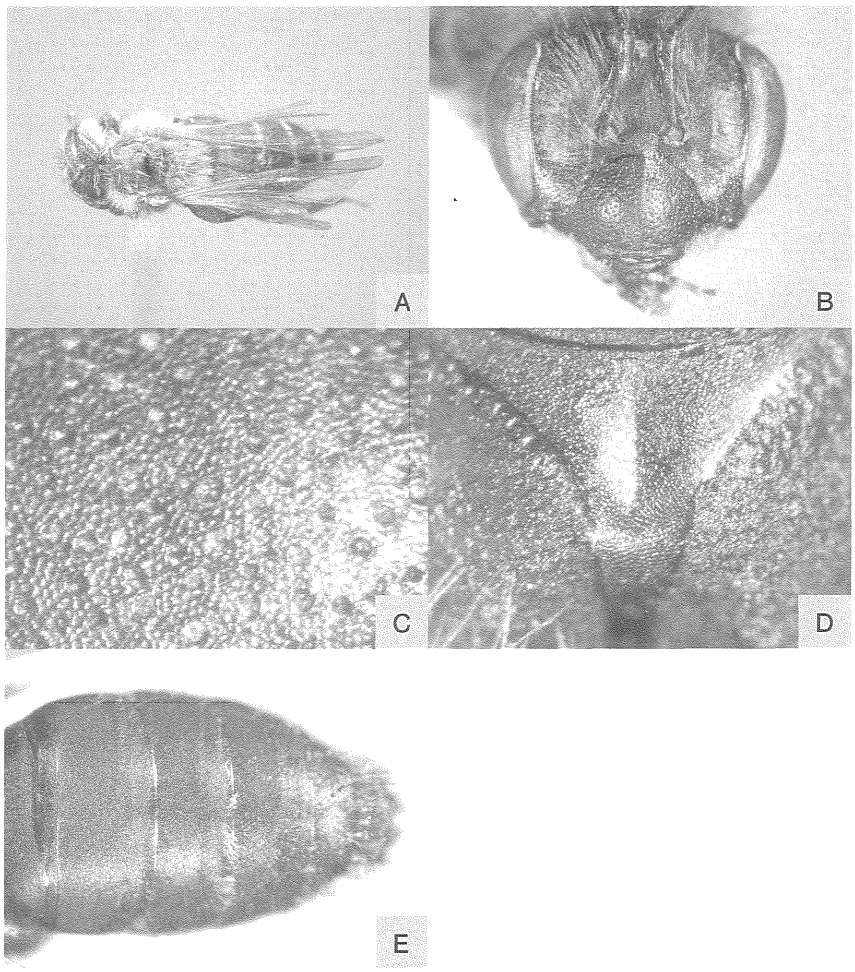

Fig. 4. A-E. *Andrena* (*Hoplandrena*) *tibetica* n. sp. Female A: general habitus; B: head in frontal view C: mesoscutum; D: propodeum; E: metasomal terga.

FL3, which are longer than broad, intermediate segments longer than broad. Eyes with inner margins paralleled. Facial fovea broad above, narrowing toward below, exceeding below a line at lower margin of antennal fossae, FVL = 1.7 mm, FVW = 0.8 mm. Supraclypeal area dulled by coarse PP. Face above antennal fossae with weak longitudinal rugulae and fine PP, surface shagreened. Facial quadrangle longer than broad (about 3.0: 2.6). Clypeus well convex, weakly tessellate, surface shiny with crowded PPø30-40 μ, IS < 0.5, with median longitudinal impunctate space, CPL = 1.4 mm. Process of labrum trapezoidal, about one-fourth as long as broad at base, entire apically, surface smooth and shiny. Labrum apical to process truncate, without cristae. Lower paraocular area finely tessellate with close small PP, sparser

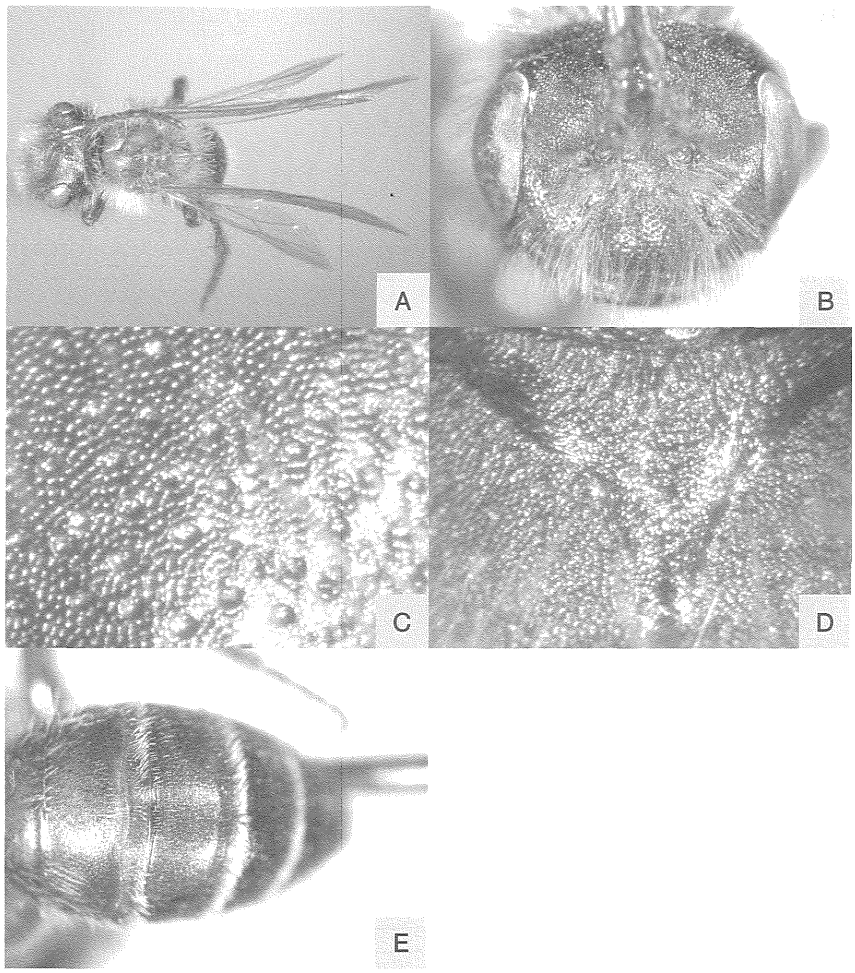

Fig. 5. A-E. *Andrena* (*Hoplandrena*) *tibetica* n. sp. Male A: general habitus; B: head in frontal view C: mesoscutum; D: propodeum; E: metasomal terga.

than clypeus. Malar space about one-fourth as long as width of basal mandible. Genal area broader than eye, GW: EW = 1.0: 0.9, surface densely tessellate posteriorly, smooth and shiny with a linear PP near eye. *Mesosoma*: Pronotum finely tessellate with obscure PP anteriorly. Mesoscutum densely tessellate peripherally, finely tessellate and feebly shiny medially with weak PP. Scutellum densely tessellate posteriorly, smooth and shiny anteriorly with close small PP, IS = 1. Propodeal enclosure finely tessellate all over; dorsal face of propodeum densely tessellate with weak small PP, surface shagreened. Mesepisternum strongly tessellate. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: metasomal terga densely tessellate, with weak and sparse minute PP on tergum 1 near apical area;

impunctate on rest of tergal segments; posterior depressions of terga narrow, not well indicated; pygidial plate large, V-shaped with rounded apex, with internal broad raised triangular area. Sterna 2-5 finely tessellate, weakly shiny, surface finely punctate near apical areas, sparsely punctate at basal areas.

Male: BL 10.5 mm, WL 9.0 mm (n=1).

Color: Flagellum dark brown beneath; mandible reddened apically; wing membranes infumate, veins and pterostigma reddish brown; tibial spurs yellow; posterior margins of metasomal terga yellowish brown.

Pubescence: Hairs on head dense, dull white mixed with black; those on clypeus 500-600 μ; those on antennal area black mixed with dull white; those on vertex 400-700 μ, black with dull white; those on genal area black above, dull white below. Hairs on thorax dense, dull white; those on mesoscutum and scutellum 600-800 μ, darker; those on propodeum and mesepisternum dull white. Hairs on metasomal terga as in female, but rather short and sparse; terga 2-4 with white hair bands, interrupted on tergum 2; terga 5-6 with black hairs; sterna 2-5 with short, incomplete white subapical fimbriae.

Structure: Head: HL/ HW = 0.80. HW: MsW: MtW = 3.5: 2.7: 2.7. Vertex weakly tessellate with fine minute PP, shiny, coarsely punctate above lateral ocelli. OOD: POD: OCD = 0.8: 0.4: 0.4. FL1 shortest, about quadrate; FL2 and the following flagellar segments distinctly longer than broad. Eyes with inner margins paralleled. Supraclypeal area and face above antennal fossae sculptured as in female. Facial quadrangle broader than long (about 2.5: 2.2). Clypeus well convex, surface weakly tessellate, shiny with distinct crowded PPø 30-40 μ, IS < 0.5, without median longitudinal impunctate line, CPL = 1.0 mm. Process of labrum as in female, but smaller. Mandibles decussate. Lower paraocular area densely punctate with PPø20 μ, IS < 0.5. Malar space about one-third as long as width of basal mandible, with apical long spine. Genal area angulate posteromedially, broader than eye, GW: EW = 1.1: 0.8, surface finely tessellate posteriorly, smooth and shiny with close minute PP near eye. *Mesosoma*: Pronotum with humeral angle and dorsoventral ridge, which crossed by deep suture, surface finely tessellate. Mesoscutum, scutellum, propodeal enclosure sculptured as in female. Dorsal face of propodeum densely tessellate with obscure PP. Mesepisternum densely tessellate with weak minute PP. Vein 1st *m-cu* meeting second submarginal cell beyond middle of cell. *Metasoma*: Metasomal terga densely tessellate as in female, but posterior depressions of terga well indicated. Sterna 2-5 weakly tessellate, shiny, sparsely punctate basally, impunctate apically; sternum 6 flat, not emarginated.

Type material: Holotype female, Dongqiong, 1,900-2,150 m, Cayu County, Xizang Autn. Region, China, 15. vii. 1973 (F-s. Huang). Paratypes: 1 female, Aza, 2,460 m, Cayu County, Xizang Autn. Region, 19. viii. 1973 (F-s. Huang); 1 male, Zhongdian, 3,250 m, Yunnan Province, 22. viii. 1982 (S-y. Wang); 1 female, Xiangcheng, 2,300-2,500 m, Sichuan

Province, 29. vi. 1983 (H-c. Cai).

Remarks: This species is similar to *Andrena dentata* Smith in having the metasomal terga densely tessellate. The female of this species can be separable from that of *dentata* by the flagellar segments ferruginous beneath, the tibial scopa with brown hairs, the metasomal terga with long brown hairs, the first flagellar segment longer than the next two segments. The male of this species can be separated from that of *dentata* by the clypeus with brown hairs and closer punctures, the taller vertex, and the more tessellate metasomal terga. It is notable that the male collected in August has a spine on the malar space.

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

Flight records: Female: late June to mid August. Male: late August.

Floral association: Not available.

Etymology: The specific name, *tibetica*, is derived from the type locality, Tibet, China.

5. *Andrena* (*Hoplandrena*) *fagopyri* n. sp.

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

Female: BL 14.2-15.5 mm, WL 11.0-11.7 mm (n=22).

Color: Flagellum reddish yellow beneath; mandible with apical half reddened; wing membranes yellowish brown basally, paler apically, veins and pterostigma reddish brown; tibial spurs yellow; posterior margins of metasomal terga reddish brown.

Pubescence: Hairs on head more or less dense, black; those on clypeus 200-400 μ; those on antennal area darker; those on vertex 500-700 μ; facial fovea black above, paler below. Hairs on thorax pale yellow; those on mesoscutum sparse (400-500 μ); those on scutellum 500-700 μ, those on mesepisternum 700 μ; propodeal corbicula developed, with internal sparse, simple hairs; trochanteral floccus imperfect, brown; femoral floccus dense, dull whitish; tibial scopal hairs long, simple, dull white. Hairs on metasomal terga more or less dense, erect; those on terga 1-2 long, dull whitish to whitish brown; those on terga 3-4 shorter, brown; terga 2-4 with complete white hair bands; caudal fimbria black; sterna 2-5 with erect brown hairs, without subapical fimbriae.

Structure: Head: HL/ HW =0.81. HW: MsW: MtW = 4.2: 4.2: 4.7. Vertex tall, shagreened by dense minute PP. OOD: POD: OCD = 0.9: 0.5: 0.5. FL1 longer than FL2+3, FL2 = FL3 which are as broad as long, following flagellar segments longer than broad. Eyes with inner margins paralleled. Facial fovea broad, extending to below a line at lower margins of antennal fossae, FVL = 1.7 mm, FVW = 0.6 mm. Supraclypeal area dulled with dense transverse rugulae. Face above antennal fossae dulled by coarse PP. Facial quadrangle broader than long (about 3.1: 2.8). Clypeus well convex, weakly tessellate, surface densely punctate with large PPø40 μ, IS < 0.5, smaller laterally, without median longitudinal impunctate line, CPL = 1.5 mm. Process of labrum trapezoidal, thickened and weakly emarginate apically, surface

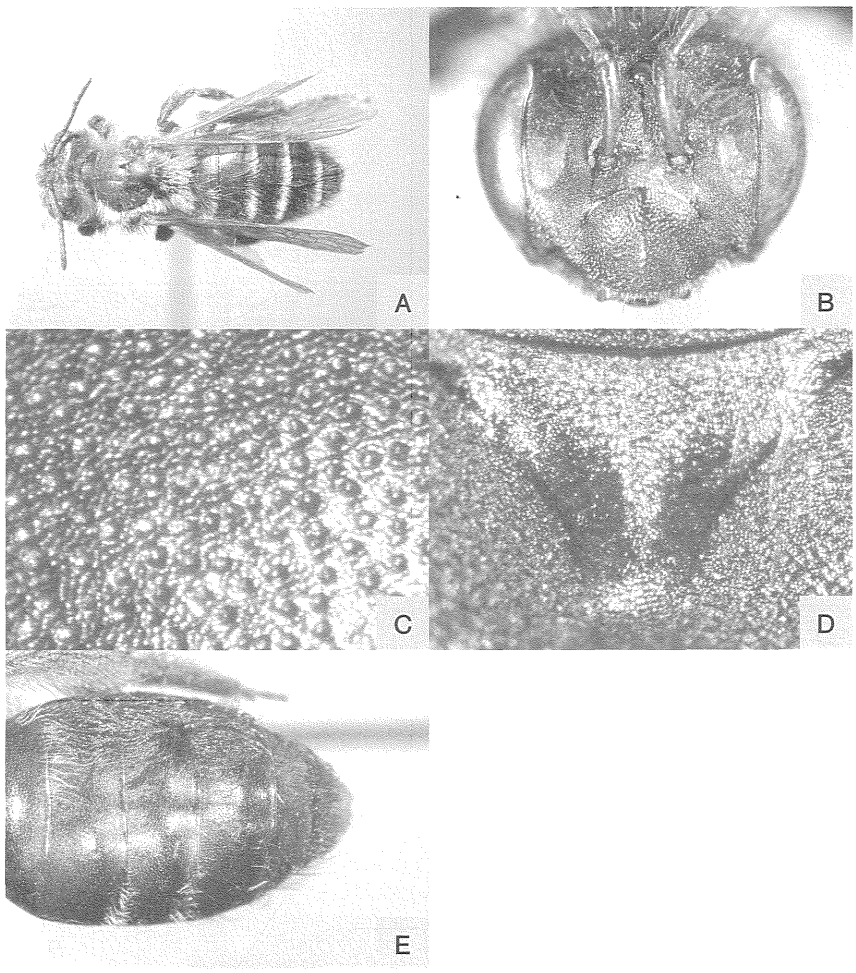

Fig. 6. A-E. *Andrena* (*Hoplandrena*) *fagopyri* n. sp. Female A: general habitus; B: head in frontal view C: mesoscutum; D: propodeum; E: metasomal terga.

with transverse rugulae at base. Labrum apical to process sulcate with transverse sulcus, without median cristae. Lower paraocular area densely punctate with small PP. Malar space distinct, minimum length about one-fourth as long as width of basal mandible. Genal area broader than eye, GW: EW = 1.1: 0.9, surface finely tessellate with close minute PP near eye. *Mesosoma*: Pronotum without humeral angle and ridge, dorsal surface weakly reticularly shagreening, scattered minute PP anteriorly. Mesoscutum densely tessellate, feebly shiny medially with close minute PP, IS = 0.5-1. Scutellum densely tessellate posteriorly, smooth and shiny anteriorly with crowded minute PP, IS < 0.5. Propodeal enclosure densely tessellate all over; dorsal face of propodeum shagreened by dense tessellation and punctation.

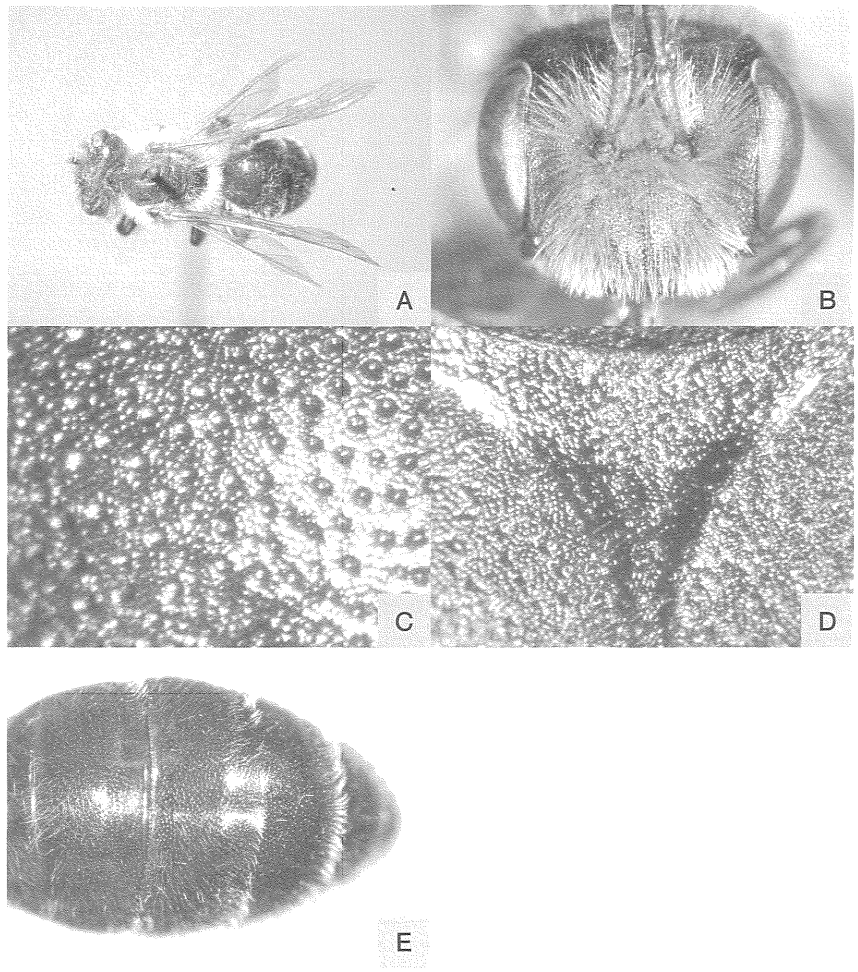

Fig. 7. A-E. *Andrena* (*Hoplandrena*) *fagopyri* n. sp. Male A: general habitus; B: head in frontal view C: mesoscutum; D: propodeum; E: metasomal terga.

Mesepisternum strongly tessellate, surface opaque. Vein 1st *m-cu* meeting second submarginal cell at basal two-thirds of cell. *Metasoma*: Metasomal terga finely tessellate, surface scattered weak minute PP, IS = 1.5-3; posterior depressions of terga narrow, well indicated; pygidial plate V-shaped, with internal broad raised triangular area. Sterna 2-5 weakly tessellate, shiny, narrowly impunctate apically, broadly finely punctate basally.

Male: BL 12.0-13.0 mm, WL 10.0-10.2 mm (n=3).

Color: Flagellum dark brown beneath; mandible with apical half reddened; wing as in female; tibial spurs yellow; posterior margins of metasomal terga reddish brown.

Pubescence: Hairs on head more or less dense, dull fulvous to black; those on clypeus 400

μ, dense; those on paraocular area black; those on vertex 400-600 μ, dull fulvous; those on genal area short, paler, black along outer margin of eye. Hairs on mesoscutum 300-400 μ, sparse, dull white; those on scutellum and metanotum long (600-700 μ), dense, dull fulvous; those on mesepisternum whitish. Hairs on metasomal terga as in female, but shorter, terga 2-4 with white hair bands, interrupted on terga 2-4; sterna 2-5 with short, sparse, dull white subapical fimbriae.

Structure: Head: HL/HW =0.80. HW: MsW: MtW = 3.8 :3.5:3.5. Vertex densely tessellate with fine minute PP. OOD: POD: OCD = 0.84: 0.4 : 0.4. FL1 longer than FL2, FL2 shortest, longer than broad, following flagellar segments longer than broad. Eyes with inner margins paralleled. Supraclypeal area shagreened by coarse minute PP. Face above antennal fossae with weak longitudinal rugulae and fine interrugal PP. Facial quadrangle broader than long (about 2.7:2.4). Clypeus well convex, surface weakly tessellate, feebly shiny medially with PPø20-30 μ, IS < 0.5, without median longitudinal impunctate line, CPL = 1.1 mm. Process of labrum broad, short, about one-third as long as broad, truncate, entire apically. Mandibles decussate. Lower paraocular area densely punctate with fine PP. Malar space about one-fourth as long as width of basal mandible; mala spece witout a spine. Genal area broader than eye, GW: EW = 1.2: 0.9, surface finely tessellate-punctate. *Mesosoma*: Pronotum finely tessellate with weak minute PP anteriorly. Mesoscutum densely tessellate peripherally, finely tessellate medially with minute PP, IS = 0.5-1. Scutellum densely tessellate posteriorly, weakly tessellate anteriorly and shiny with close PP, IS < 0.5. Propodeal enclosure narrow, densely tessellate basally, finely tessellate and feebly shiny apically; dorsal face of propodeum densely tessellate with weak PP, shagreened. Mesepisternum densely tessellate with weak minute PP, IS = 1. Vein 1st *m-cu* meeting second submarginal cell near middle of cell. *Metasoma*: Metasomal terga weakly tessellate, broadly shiny with sparse fine PP, IS = 0.5-3, irregular in distribution; posterior depressions of terga narrow, not well indicated. Sterna 2-5 smooth and shiny, PP as in female; sternum 6 narrowly reflected.

Type material: Holotype female, Mt. Xiaowutaishan, 1200 m, Hebei Province, China, 12. viii. 1964 (Y-h. Han); Paratypes: China: 1 female, same data as the holotype; 15 females, same locality as the holotype: 21. viii. 1964 (C-g. Wang); 2 females, 23. viii. 1964 (C-g. Wang); Beijing: 1 female, Xiaolongmen, 26. vii. 1985 (S-y. Wang); 2 males, Xiaolongmen, 700 m, 28. vii. 1995 (H-l. Xu). Shannxi Province: 1 female, eastern Tomb (Xian), without date and collector; Heilongjiang Province: 1 female, Djalantun, vii. 1939.

Remarks: This species is somewhat similar to *Andrena carantonica* Pérez by the large size, the metasomal terga with long hairs, but it can be separable from the latter by the 1st flagellar segment longer than F2+3, the clypeus without median impunctate line and the metasomal terga with white hair bands.

Distribution: China (Beijing, Hebei, Shannxi, Heilongjiang Provs.).

Flight records: Female: late July to late August. Male: late July.

Floral association: Fagopyrum esculentum.

Etymology: The specific name, *fagopyri*, is derived from the associated plant, *Fagopyrum esculentum.*

6. *Andrena* (*Hoplandrena*) *akitsushimae* Tadauchi et Hirashima

Andrena (*Hoplandrena*) *akitsushimae* Tadauchi et Hirashima, 1984, Kontyû, 52: 284-285 [female & male, Japan]; Tadauchi et al., 2001, Esakia, (41): [in URL]; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 68-69.

Andrena (*Hoplandrena*) *pruniphora* Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 93 [female & male], in part.

Type specimen examined: Holotype female (Type No. 2433, Kyushu Univ., Fukuoka), Hatahoko, Mt. Norikura, Gifu Pref., Japan, 8. v. 1976 (O. Tadauchi).

Remarks: This species closely resembles *Andrena* (*Hoplandrena*) *nudigastroides* Yasumatsu , but can be separable from the latter by the clypeus more convex, the subapical margin of the pronotum emarginated in the middle, the mesoscutum more densely tessellate, and the metasoma more tessellate with punctures smaller and denser. The male head and mesepisternum covered with long, fuscous hairs in the 1st generation and the male mesoscutum with short, fuscous hairs in the 2nd generation.

Distribution: Japan (Hokkaido, Honshu, Sado Is., Hachijo Is., Shikoku, Kyushu, Yakushima Is.).

Flight records: Two generations a year. Female: late March to late June (1st g.), late May to late August (2nd g.). Male: late March to early June (1st g.), early June to late August (2nd g.).

Floral association: Tadauchi and Hirashima (1984) recorded 13 flowering plants.

7. *Andrena* (*Hoplandrena*) *miyamotoi* Hirashima

Andrena (*Hoplandrena*) *miyamotoi* Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 87 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 100, 115 [female & male, in key]; Tadauchi and Hirashima, 1984, Kontyû, 52: 284-285 [in key]; Osytshnjuk, 1995, Key Insects Russian Far East, Vol. IV. Part 1, 501, 520 [female & male, in key]; Tadauchi et al., 1997, Esakia (37): 200 [in list, Korea]; Tadauchi et al., 2001, Esakia, (41): [in URL]; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 488.

Type specimens examined: Holotype male and allotype female (Kyushu Univ., Fukuoka), Karuizawa, Honshu, Japan, 24. viii. 1952 (R. Ishikawa).

Remarks: This species is characterized by the mesoscutum covered with sparse, blackish hairs, scattered with weak punctures in female, and the clypeus with black hairs, the malar space with short spine, the hairs on mesoscutum whitish, mixed with sparse black ones, the clypeus densely tessellate, the subapical margin of pronotum not emarginated in the middle in male.

Distribution: Japan (Honshu, Sado Is., Shikoku, Kyushu); Korea, Russia (Far East Area).

Flight records: Two generations a year. Female: mid to late May, early July. Male: early to late May, early August.

Floral association: See Hirashima (1964).

8. *Andrena* (*Hoplandrena*) *nudigastroides* Yasumatsu

Andrena (*Chlorandrena*) *nudigastra nudigastroides* Yasumatsu, 1935, Insects Jehol, (3) 7: 40 [female, China]; Yasumatsu, 1941, Peking nat. Hist. Bull., 15: 279 [in list].

Andrena (*Hoplandrena*) *pruniphora* Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 93-96 [female & male, Japan]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 100, 115 [female & male, in key]; Tadauchi & Hirashima, 1984, Kontyû, 52: 284-285 [in key]. Kim, 1970, Ill. Encycl. Faun. & Fl. Korea, 11 (3): 661 [Korea]; Tadauchi et al., 1997, Esakia, (37): 200 [Korea]; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 613-614. **n. syn.**

Andrena (*Hoplandrena*) *bimaculata* Xu [nec *Melitta bimaculata* Kirby, nec *Andrena bimaculata* Lepeletier] 1994, Sinozoologia, (11): 199-200 [female & male, China]; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 613-614 [synonymy].

Type specimen examined: Holotype female (Natural Science Museum, Tokyo), Jehol (now is Chengde, Hebei Prov.), 2. ix. Other material: **CHINA**: Beijing: Baihuashan: 2 females, 18. viii. 1973 (Y-q. Liu); 1 female, 6. viii. 1989 (H-l. Xu); Xiaolongmen: 28-30. viii. 1991 (Y-s. Shi). Hebei Province: Xiaowutaishan: 3 females, 12. viii. 1964 (J-l. Mao); 2 females, 14. viii. 1964; 1 female, 20. viii. 1964; 1 female, 25. viii. 1964 (Y-h. Han). **JAPAN**: 1 female, Mt. Kuju, Oita Pref., 10. iv. 1959 (Y. Miyatake), 1 male, Urabandai, Fukushima Pref., 16-17.v. 1957 (R. Ishikawa), 1 male, Karuizawa, Nagano Pref., 22. viii. 1949 (R. Ishikawa).

Remarks: It is similar to *Andrena dentata* Smith, but can be separable from *dentata* by the 1st flagellar segment slightly shorter or as long as the next two segments (much shorter in *dentata*), the process of labrum slightly emarginate, the mesoscutum smooth and shiny medially and the metasomal terga weakly tessellate with fine punctures.

Distribution: China (Beijing, Hebei Prov.); Japan (Honshu); Korea (southern and central

Korea).

Flight records: Two generations a year. Female: late May to late June, early August to early September. Male: mid May to mid June, mid July to late August.

Floral association: Not available in China.

9. *Andrena* (*Hoplandrena*) *dentata* Smith

Andrena dentata Smith, 1879, Descr. New Spec. Hym. in B. M., 51 [male, Japan]; Dalla Torre, 1896, Cat. Hym., 10: 117; 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. & Flor. Korea, 11(3): 659 [Korea].

Andrena biscutata Pérez, 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]; Hirashima, 1966, J. Fac. Agr., Kyushu Univ., 14: 100, 115 [female & male, in key]; Tadauchi & Hirashima, 1984, Kontyû, 52: 284-285 [in key]; Tadauchi & Lee, 1992, Esakia, (32): 50 [Korea]; Osytshnjuk, 1995, Key Insects Russian Far East, Vol. IV. Part 1, 501, 520 [female & male, in key, Russian Far East]; Tadauchi et al., 1997, Esakia, (37): 200 [Korea]; Tadauchi et al., 2001, Esakia, (41): [in URL]; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 221-222.

Specimens examined: **CHINA**: Shanghai: 1 female, 2. iv. 1925 (O. Piel); 4 females, 13. iv. 1955 (K-r. Huang); 1 male, 2. iv. 1933 (A. Savio). Jiangsu Province: Tchenkiang (now is Zhenjiang city), 1 female, 13. iv. 1918; 1 female, 16. iv. 1918; 1 female, 5. iv. 1919 (O. Piel). Zhejiang Province: 2 females, Chusan, 22. iv. 1931 (O. Piel); 1 female, Mokanshan, 13. v. 1936 (O. Piel). Shandong Province: Qingdao: 1 female, 19. iv. 1991; 1 male, 20. iv. 1991; 1 females, 22. iv. 1961 (Y-l. Chen); Weihai: 4 females and 2 males, 19. iv.- 2. v. 1991 (H-l. Xu). Sichuan Province: 1 female, Emeishan, 550-750 m, 29. iii. 1957 (K-r. Huang). Liaoning Province: 3 females, Kao-lin-Tse (now is Gaolingzi), 7-16. vi. 1940; 1 female, Anshan, 24. v. 1962 (T-r. Chen). Heilongjiang Province: 2 females, Jingpo Lake, Mudanjiang, 25. v. 1993 (O. Tadauchi). **JAPAN**: 3 females, Ishii-mura, near Matsuyama, Shikoku, 21. iv. 1960; 2 males, Nakayama, Koriyama, Fukushima Pref., 23. v. 1975 (O. Tadauchi).

Remarks: It is recognized by the entire process of labrum and coarsely punctate clypeus, reddish yellow to fuscous hairs on dorsum of thorax and the metasomal terga reddened partly. The color of hairs on the thorax is variable, which caused two synonymies.

Distribution: China (Shanghai, Jiangsu, Zhejiang, Shandong, Sichuan, Liaoning, Heilongjiang Provs.); Japan (Hokkaido, Honshu, Sado Is., Shikoku, Kyushu, Tsushima Is.);

Korea (south to north Korea); Russia (Far east area).

Flight records: Two generations a year. Female: March to late June, early to late August. Male: March to late May, early August to early September.

Floral associations: Japan: *Brassica campestris*. China: *Malus* sp., *Pyrus* sp., *Brassica* sp., *Taraxacum* sp.

10. *Andrena* (*Hoplandrena*) *macroceps* (Matsumura)

Melitta macroceps Matsumura, 1912, Thous. Ins. Japan, suppl. 4: 207, 208 [male, Japan].
Andrena (*Hoplandrena*) *macroceps*: Hirashima, 1964, J. Fac. Agr., Kyushu Univ., 13: 96-97 [redescription of holotype]; Tadauchi & Hirashima, 1984, Kontyû, 52: 285 [male, in key]; Tadauchi & Hirashima, 1987, Esakia, (25): 137-138 [female]; Tadauchi et al., 2001, Esakia, (41): [in URL]; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 447-448.

Type specimen examined: Holotype male, Sapporo, 8. v. (Hokkaido Univ., Sapporo). Other material: **JAPAN**: 3 females and 20 males, Tokachimitsumata, Mt. Taisetsu, Hokkaido, 29. v. 1984 (O. Tadauchi).

Remarks: This species is very close to *Andrena dentata* Smith, but the first generation of this species is separated from *dentata* in female by the head and thorax with bright fulvous hairs and the vertex without brown hairs, and in male by the 2nd flagellar segment nearly as long as 3rd (2nd longer than 3rd in *dentata*).

Distribution: Japan (Hokkaido).

Flight records: Female: late May to early July. Male: early May to late May.

Floral association: See Tadauchi & Hirashiama (1984).

11. *Andrena* (*Hoplandrena*) *romankovae* Osytshnjuk

Andrena (*Hoplandrena*) *romankovae* Osytshnjuk, 1995, Key Insects Russian Far East, Vol. IV. Part 1, 501 [female, in key]; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 638.

Specimens examined: We could not examine the type specimen in the present study. Gusenleitner & Schwarz (2002) pointed that this species may be synonymy of European *Andrena nuptialis* Pérez. We only cite here this species after Osytshnjuk (1995).

Remarks: This species was described based on females from south Primorsky by Osytshnjuk as follows: Clypeus less shiny with median impunctate line, but not reaching its apex (approximately by 1/3); all metasomal terga usually black with narrow light yellow

apical areas, with black hairs (with admixture of light hairs on the 2nd), and their apical parts have continuous fossae of longer whitish hairs; all metasomal terga more or less sparcely punctate; 14.5-15 mm.

Distribution: Russia (Far East Area: S. Primorsky).

Flight record: Female: mid May.

Floral association: *Taraxacum* sp.

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