

Systematic and biological studies of the family Andrenidae of Japan (Hymenoptera, Apoidea) Part 2. Systematics, 7

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Systematic and biological studies of the family Andrenidae
of Japan (Hymenoptera, Apoidea)

Part 2. Systematics, 7*

Yoshihiro HIRASHIMA

ADDITIONAL DESCRIPTION OF THE NEW SPECIES

After having prepared the manuscript of the present work, I made several collecting trips to certain localities of Honshu, and was able to collect three new forms of *Andrena*. In order to present an up-to-date key for the Japanese *Andrena*, which will be given below, the descriptions of the new forms are added here.

(60) *Andrena* (*Cnemidandrena*) *albicaudata* sp. n.

In Japanese fauna, this new species is easily separated from *Andrena seneciorum* Hirashima and *Andrena mactai* Hirashima in the absence of black hairs on the thorax and metasoma. This is an intermediate form in size between them. In Palaearctic fauna, the present new species is nearest to *Andrena fuscipes* Kirby so far as the colour of the hairs on the thorax is concerned, but is easily separable from the latter in having the more abundant fulvous hairs on the metasoma, in the absence of blackish hairs on the legs and 5th and 6th metasomal terga, etc.

The fresh specimens of this species have been collected by the author toward the end of August, at Sugadaira, Shinshu.

Female: Length 10-11 mm.

Colour: Black; mandibles broadly reddened apically; flagellum beneath broadly ferruginous except two basal segments; tegulae, which are covered with hairs, brownish; wings semihyaline with distal margins darkened; veins and stigma brown; small segments of tarsi reddened; tibial spurs pale; posterior margins of terga, which are hidden by hairs, pale brownish or narrowly yellowish.

Pubescence: Hairs on face dull grey, not specially dense; similar hairs on clypeus; hairs on vertex fulvous; thorax above densely covered with long fulvous

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hairs; hairs on thorax becoming whitish toward beneath; metasoma densely covered with long, fulvous hairs which are becoming whitish toward apical terga; caudal fimbria whitish, narrowly golden medio-apically; hairs on posterior parts of intermediate terga decumbent, forming an indefinite, broad hair band on each tergum; hairs on underside of metasoma pale; hairs on legs pale, those on inner sides of metatarsi ferruginous; tibial scopa pale, uniform in colour.

Structure: Head subquadrate in front view; mandibles moderate; malar space linear, slightly widened posteriorly; process of labrum rather large, truncate, deeply emarginate medially; this is similar in shape to that of *seneciorum*, not convex and shiny as in *fuscipes*; clypeus broadly nearly flat, entirely dull, scattered with rather weak punctures; antennae with 3rd segment about equal to 4th plus 5th; facial fovea broad, rather short, separated from eye margin by a narrow space; ratio of postocellar distance to postocellar width to ocelloccipital distance to ocellocular distance 3.8:1.5:2.0:4.2; cheeks rounded. Mesoscutum densely tessellate, entirely dull, with an indication of weak, sparse punctures; scutellum smoother anteriorly; propodeum entirely dull; enclosure ill defined, granulate, slightly roughened basally; propodeum outside enclosure with roughened punctures not conspicuous; mesopleura nearly dull, tessellate, with an indication of roughened punctures. Mid basitarsi as broad as hind basitarsi which are narrowed toward apex; trochanteral floccus dense but hairs on basal portion not arranged in a compact fringe; tibial scopa with short, soft hairs. Metasoma granular, dull, or slightly shiny on apical terga, with an indication of weak punctures.

Male: Length about 8 mm.

Colour: Black; mandibles deep red apically; flagellum beneath broadly reddish brown except 1st segment; tegulae brownish, wings and veins as in female or more paler; legs piceous or partly brownish; small segments of tarsi reddish brown; spurs pale; metasoma not at all deep black, with posterior margins of terga yellowish transparent.

Pubescence: Clypeus and face densely covered with long, dull white hairs; hairs on vertex yellowish; thorax above with dense, long, fulvous hairs; hairs on underside of thorax whitish; hairs on legs whitish to yellowish; metasomal terga densely covered with pale fulvous hairs, not intermixed with darkened hairs; hairs on posterior margins of 2nd to 4th terga decumbent, forming an obscure hair band.

Structure: Head large, quadrate in front view; mandibles slender, falciform, not specially long; malar space linear; process of labrum protuberant, shiny, deeply emarginate medially; clypeus flat, rather densely punctured; antennae slightly elongate, with 3rd segment much longer than wide (a little less than one and one-half times as long as broad), slightly longer than 5th which is a little longer than 4th; ratio of postocellar distance to postocellar width to ocelloccipital distance to ocellocular distance 4.0:1.3:2.5:5.0; cheeks broadened, nearly keeled posteriorly; cheeks elongate behind seen from above. Mesoscutum, scutellum and mesopleura sculptured nearly as in female; propodeal enclosure narrower than in female, more broadly roughened (although weakly so). Legs slender, as usual. Metasoma shiny; posterior depressions of terga indistinct.

Distribution: Japan (Central Honshu).

Type material: Holotype female, allotype male, and 4 paratype females, Sugadaira, Shinshu, 1,300-1,500 m., 30. viii. 1963 (Y. Hirashima).

Type depository: All the types will be deposited in the Entomological Laboratory, Faculty of Agriculture, Kyushu University.

Flower record: None.

(61) *Andrena (Micrandrena) sublevigata* sp. n.

Andrena (Micrandrena) brassicae Hirashima, 1957, Mushi, 30 (9): 52, ♂ not ♀ (in part).

This new species is easily recognizable by the shiny and nearly smooth integuments of the mesoscutum and metasomal terga. So far as the smooth mesoscutum is concerned, this species is best comparable with *A. brassicae* Hirashima, but is separable from the latter in having the propodeal enclosure much less coarsely sculptured, mesopleura much more coarsely sculptured, etc. in the female, and the much more hairy and much more coarsely sculptured clypeus, the proportion of antennae, etc. in the male. The other distinguishing structures will be noted in the description.

A long series of female specimens has been collected by the author at Fukuchiyama Farm, Takeda CIC on *Brassica campestris*. Some other specimens of *Andrena brassicae* Hirashima should be identified as the present new species.

Female: Length about 6.5 mm.

Colour: Black; mandibles reddened apically; flagellum beneath dark reddish brown; tegulae brownish transparent posteriorly; wings semihyaline, stigma and veins pale brownish; tarsi brownish, spurs pale; posterior margins of terga brownish.

Pubescence: Hairs on face and clypeus sparse, dull grey; facial fovea silvery in some light, not conspicuous; mesoscutum nude, only with inconspicuous, sparse, white hairs; scutellum with a few long, whitish hairs; metascutum nude; propodeum broadly bare dorsally; propodeal corbicula scanty, whitish; hairs on legs silvery including trochanteral floccus and tibial scopa; metasoma scanty of hairs, broadly nude basally; lateral white hair fringes of 2nd and 3rd terga scanty, less evident than in *brassicae*; caudal fimbria pale brownish, slightly more yellowish than in *brassicae*.

Structure: Process of labrum narrower than in *brassicae*; malar space linear; clypeus granular, dull, more punctate than in *brassicae*; 3rd antennal segment slightly longer than broad, shorter than 4th and 5th combined; ratio of postocellar distance to postocellar width to ocelloccipital distance to ocellocular distance about 2.5:1.1:0.7:3.0. Mesoscutum finely and weakly tessellate, distinctly shiny, scattered with microscopical punctures; scutellum slightly smoother than mesoscutum, more shiny; metascutum finely granular; propodeal enclosure broad, ill defined, not at all roughened or with weak rugae basally; propodeal enclosure much less coarsely sculptured than in *brassicae*; posterior half of mesopleura granular, more coarsely sculptured than in *brassicae*. Legs as usual. Metasoma impunctate, shiny; 1st tergum finely and weakly tessellate, nearly sculptured as in mesoscutum except punctuation; 2nd tergum slightly tessellate, 3rd nearly smooth, 4th smooth and more shiny; posterior depressions of intermediate terga weakly indicated.

Male: Length about 5.5 mm.

Colour: Black; mandibles reddened apically; flagellum brownish beneath; tegulae pale brownish transparent posteriorly; wings semihyaline, veins and stigma yellowish brown; tarsi brownish, small segments of tarsi more paler; posterior margins of metasomal terga narrowly pale brownish.

Pubescence: Hairs on head and thorax long, silvery white, not mixed with darker ones; hairs on clypeus downy, not dense on the middle; hairs on mesoscutum sparser than those on mesopleura; metascutum covered with sparse hairs; hairs on legs primarily white; metasoma scanty of hairs, only covered with short, fine, white (glistening in some light) hairs; 2nd and 3rd terga with fringe-like white hairs on the posterior margins; sterna with long white hairs.

Structure: Head broader than long (about 6.0:4.8); facial quadrangle slightly longer than wide (about 4.8:4.3); inner margins of eyes slightly convergent below; clypeus well convex, granular and rugoso-punctate with small punctures, without smooth shiny space; antennae not specially long; 3rd segment a little broader than long, about as long as or indistinctly shorter than 4th; 5th much longer than 4th, the ratio about 1.9:1.3; ratio of postocellar distance to postocellar width to ocellocipital distance to ocellocular distance about 2.6:1.0:0.5:3.3; cheeks receding. Mesoscutum nearly dull, slightly more strongly tessellate than in female, not roughened; anterior portion of scutellum slightly smoother than mesoscutum; metascutum granular; propodeal enclosure ill defined, slightly more wrinkled than in female, distinctly less coarsely sculptured than in *kaguya*; mesopleura shagreened. Legs as usual. Metasoma tessellate, but smoother than in *kaguya*; posterior depressions of terga weakly indicated.

Distribution: Japan (Honshu, Kyushu).

Type material: Holotype female, 213 paratopotype females, and 14 paratopotype males (205 ♀♀ and 14 ♂♂ were captured on *Brassica campestris rapa*, 4 ♀♀ on *Prunus* sp. (Sakura), 3 ♀♀ on *Prunus persicae*, and 2 ♀♀ on *Cardamine flexuosa*), Fukuchiyama Farm, Takeda CIC, Honshu, 12. iv. 1963 (Y. Hirashima); 6 ♀♀, 6 ♂♂, Yonezawa, Uzen, Honshu, 13. iv. 1946 (Y. Kurosawa); 1 ♂, on *Brassica campestris*, Sinodayama, Osaka, 19. iv. 1960 (I. Hiura); 1 ♀, on *Brassica*, Hachinoe, Aomori Pref., 17. v. 1960 (A. Fukuda); 1 ♀, on *Brassica*, Takinoya, Hyogo Pref., 22. iv. 1960 (R. Morimoto); 1 ♂, Fukuoka, Kyushu, 22. iii. 1950 (Y. Hirashima) (paratype of *A. brassicae*); 2 ♂♂, Fukuoka, Kyushu, 20. iii. 1951 (Y. Hirashima) (paratypes of *A. brassicae*); 2 ♂♂, Mt. Homanzan, Chikuzen, Kyushu, 18. iii. 1951 (Y. Hirashima) (paratypes of *A. brassicae*); 5 ♂♂ on *Brassica*, Fukuoka, Kyushu, 17. iii. 1952 (Y. Hirashima); 1 ♀, 1 ♂, Dazaifu, Chikuzen, Kyushu, 19. iii. 1959 (Y. Hirashima); 1 ♀, 1 ♂, Kashii, Fukuoka, Kyushu, 25. iii. 1959 (Y. Hirashima).

Type depository: Holotype is deposited in the collection of the Entomological Laboratory, Faculty of Agriculture, Kyushu University.

Flower records: As stated above, this species has been collected on *Brassica campestris*, *Prunus persicae*, *Prunus* sp. (Sakura), and *Cardamine flexuosa*.

(62) *Andrena* (*Micrandrena*) *falsificissima* sp. n.

In Japanese fauna, no related species of this new species has been known. In Palaearctic fauna, this is an intermediate form between *Andrena saundersella* Perkins and *Andrena falsifica* Perkins. The length of body is smaller than the former two. The clypeus is distinctly punctured with punctures coarser than in

falsifica, weaker than in *saundersella*; flagellum more reddened beneath than in *falsifica* and *saundersella*; mesoscutum more densely punctate than in *falsifica* and *saundersella*; enclosure of propodeum much more coarsely sculptured than in *saundersella*, a little more strongly wrinkled than in *falsifica*; propodeum outside the enclosure much more coarsely sculptured than in *falsifica*; posterior depressions of intermediate terga more sharply indicated than in *falsifica*, nearly smooth, a little less pronounced than in *saundersella*; wings slightly brownish, veins and stigma darker than in *saundersella*.

Unfortunately, this species is known only from the female. A short series of female specimens has been collected by the author toward the end of August at Sugadaira, Shinshu, Honshu. It is uncertain, at the present, whether this species appears twice a year.

Female: Length about 6 mm.

Colour: Black; mandibles reddened apically; flagellum ferruginous beneath except a few basal segments; tegulae brown semihyaline posteriorly; wings slightly brownish, veins and stigma brown or slightly paler; two or three apical segments of tarsi reddish brown; spurs pale; posterior margins of metasomal terga scarcely discoloured or only slightly reddish brown in some light.

Pubescence: Hairs on head grey, not conspicuous, much shorter than in *falsifica* and *saundersella*; facial fovea narrow, separated from eye margin by a narrow space, silvery in some light; hairs on thorax grey, sparser than in *falsifica*; dorsal fringe of propodeal corbicula scanty, not arranged in a compact fringe; tibial scopa moderate, glistening, silvery; hairs on dorsal margins of hind tibiae slightly brownish basally (near the basitibial plate); metasoma scanty of hairs; posterior margins of terga without fringe of hairs; caudal fimbria brownish; sterna hairy, without special fringes.

Structure: Head transverse in front view, much more so than in *falsifica*; process of labrum rounded; clypeus well convex, densely tessellate, rather densely and more or less coarsely punctured; ratio of postocellar distance to postocellar width to ocelloccipital distance to ocellocular distance about 2.5 : 1.0 : 0.6 : 3.0. Mesoscutum finely tessellate, somewhat shagreened anteriorly, distinctly punctured; scutellum densely punctured; propodeal enclosure strongly wrinkled all over; propodeum outside enclosure slightly less coarsely sculptured than the enclosure; mesopleura shagreened anteriorly. Metasoma shiny; 1st tergum tessellate, scattered with microscopical fine punctures; posterior margins of 1st tergum rather broadly nearly smooth; 2nd tergum tessellate with fine punctures; posterior depression of 2nd tergum well indicated, broadened medially, smooth and shiny; 3rd tergum tessellate, less punctured than 2nd; posterior depression of 3rd sharply indicated, smooth and strongly shiny; 4th tergum less tessellate (more tessellate than in *saundersella*, however) than 3rd, impunctate.

Distribution: Japan (Central Honshu).

Type material: Holotype female, and 6 paratopotype females, Sugadaira, 1,300-1,500 m., Shinshu, Honshu, 30. viii. 1963 (Y. Hirashima).

Type depository: All the types will be deposited in the Entomological Laboratory, Faculty of Agriculture, Kyushu University.

Flower record: Not available.

Key to the subgenera and species (females*) of
the genus *Andrena* occurring in Japan

1. Fore wings with two submarginal cells; head indistinctly narrower than thorax, slightly transverse in front view: clypeus bare, strongly shiny, scattered with weak punctures; process of labrum small, triangular; hairs on mesoscutum pale yellowish brown in fresh specimens, not specially dense, the majority of which is short and densely branched; enclosure of propodeum poorly indicated, rugose basally, granulate elsewhere; trochanteral floccus especially well developed with long, dense, curled hairs; tibial scopa compact; metasomal teaga red and black, scanty of hairs; sterna red; length 9-10 mm. (51) (*Parandrena*) *yasumatsui*
 Fore wings with three submarginal cells..... 2
2. Small species, length about or less than 7 mm.; 1st intercubital vein ending close to pterostigma; clypeus broadly convex, densely tessellate, at least with an indication of weak punctures; facial fovea separated from eye by a shiny space; thorax with none of pubescence black; enclosure of propodeum large, usually coarsely sculptured (at least at base) except for *sublevigata*; trochanteral floccus imperfect; tibial scopa moderately compact (*Micrandrena*)
 3
 Larger, length about or more than 8 mm.; if occasionally smaller, then 1st metasomal tergum closely punctate 8
3. Metasomal terga polished, scattered with microscopical fine punctures; posterior margins of 1st to 4th terga unusually thick, black, not at all fading to brownish in colour; facial fovea separated from eye margin by a wide space; mesoscutum nearly smooth and very shiny posteriorly, scattered with weak punctures; scutellum polished; enclosure of propodeum coarsely wrinkled basally, granular apically; mesopleura broadly nearly smooth posteriorly; caudal fimbria bright golden; length about 7 mm. (42) *hikosana*
 Metasoma, at least at the bases of 2nd and 3rd terga, distinctly tessellate 4
4. Posterior margins of 2nd to 4th metasomal sterna each with a narrow fringe of short, suberect, greyish hairs conspicuous; 1st tergum polished, scattered with microscopical fine punctures, or sometimes weakly to distinctly tessellate basally; basal portion of 2nd tergum tessellate, scattered with very weak punctures; posterior depressions of 2nd and 3rd terga very broad, feebly tessellate; mesoscutum shiny, densely and rather coarsely punctured, roughened anteriorly; mesoscutum most strongly punctured among our species of *Micrandrena*; propodeal enclosure strongly wrinkled all over; propodeum outside enclosure strongly and coarsely sculptured; length 6-6.5 mm. (45) *komachi*
 Posterior margins of 2nd to 4th sterna decorated with sparse yellowish hairs not forming a compact fringe 5

* Female of *Andrena* (*Hoplendrena*) *macrocephala* Matsumura has not been known.

5. Metasomal terga, especially at the base of 2nd tergum, finely punctured; posterior depressions of 2nd to 4th terga sharply indicated, polished or nearly so, without lateral hair fringes; clypeus coarsely punctured; flagellum beneath ferruginous except two or three basal segments; mesoscutum tessellate, rather shiny, densely punctured; scutellum slightly more densely punctured than mesoscutum; enclosure of propodeum strongly wrinkled all over; propodeum outside enclosure coarsely sculptured like the preceding species; length about 6 mm. (62) *falsificissima*
 Metasoma impunctate 6
6. Mesoscutum rather densely covered with greyish or slightly yellowish hairs, densely tessellate, therefore dull, more or less densely punctured; scutellum tessellate and punctate; enclosure of propodeum wrinkled, narrowly granular apically; 1st metasomal tergum densely tessellate all over, 2nd a little weakly so, and 3rd a little more weakly so than in 2nd; lateral hair fringes of 2nd and 3rd terga dense; pterostigma brown, veins yellowish brown or more yellowish; length about 7 mm. or occasionally slightly larger (44) *kaguya*
 Mesoscutum scanty of hairs, weakly tessellate, therefore rather shiny, sparsely punctured 7
7. Mesopleura broadly nearly smooth or weakly tessellate posteriorly, therefore shiny; enclosure of propodeum strongly wrinkled nearly all over; metascutum hairy; metasomal terga distinctly tessellate; pterostigma and veins yellowish brown; length 6-7 mm. (43) *brassicae*
 Mesopleura densely tessellate posteriorly, therefore dull; mesoscutum with punctures very weak; metascutum bare, finely granulate; propodeal enclosure slightly rugose basally, granular apically, much less coarsely sculptured than the other species of *Micrandrena*; pterostigma and veins distinctly yellowish; length about 6.5 mm. (61) *sublevigata*
8. Propodeum coarsely sculptured; enclosure of propodeum well indicated, coarsely to considerably strongly wrinkled, with the apex bounded by a transverse carina or by strong wrinkles; mesopleura about as coarse as or more coarsely sculptured than dorsal face of propodeum, with an indication of very strong and close punctures 9
 Enclosure of propodeum finely sculptured; or if coarsely sculptured, then the apex of enclosure neither bounded by a transverse carina nor by irregular rugae 13
9. Facial fovea separated from eye margin by a wide shiny space; mesoscutum and scutellum either foveolate-punctate or very strongly rugoso-punctate; posterior spur of hind tibia neither widened nor curved near base; trochanteral floccus imperfect, scanty; rather small to medium-sized species, length less than 10 mm. (*Trachandrena*) 10
 Facial fovea separated from eye margin by a narrow space or scarcely separated; mesoscutum and scutellum rather strongly punctate but punctures not so close; posterior spur of hind tibia strongly widened and curved near base; trochanteral floccus nearly perfect to perfect, dense; large species, length about or more than 12 mm. 11

10. Mesoscutum and scutellum rather sparsely foveolate-punctate, sparsely clothed with primarily greyish hairs; posterior depressions of 2nd to 4th metasomal terga considerably broad, nearly smooth and impunctate; caudal fimbria brownish medially, covered with silver white hairs; legs nearly black or piceous, with tarsi brownish or obscure reddish brown; length about or slightly over 8 mm. ...
 (58) *foveopunctata*
 Mesoscutum and scutellum strongly rugoso-punctate, with punctures weaker than in *foveopunctata*, more or less densely covered with fulvous hairs; posterior depressions of 2nd to 4th metasomal terga very broad but narrower than in *foveopunctata*, with sparse and very fine punctures; caudal fimbria golden; hind tibiae and tarsi and mid tarsi ferruginous; length about or less than 10 mm. (59) *haemorrhoea japonibia*
11. Facial fovea barely separated from eye margin by a very narrow space or line; thorax with pale or dull fulvous hairs above, without admixture of brown or brownish ones; propodeum outside enclosure tessellate and densely rugose, not specially coarsely sculptured; enclosure sparsely wrinkled, transversely carinate or not carinate posteriorly; metasoma shining with weak and sparse punctures; posterior depressions of 2nd to 4th metasomal terga well indicated, fringed with sparse, white hairs laterally; at least hind tibiae and tarsi ferruginous; length about 13 mm.
 (52) (*Plastandrena*) *astragalina* (cf. No. 41)
 Facial fovea separated from eye margin by a narrow punctate space; at least some brown hairs on mesoscutum; propodeum outside enclosure very coarsely sculptured; enclosure strongly wrinkled all over and carinate posteriorly; posterior margins of metasomal terga reflected above (*Mitsukuriella*) 12
12. Mesoscutum rather densely covered with short fuscous hairs, strongly and more or less densely punctate with punctures irregular in distribution, primarily smaller than in *fukaii*; 1st to 4th metasomal terga closely to very closely, distinctly punctate, with posterior margins sharply constricted subapically and strongly reflected apically; wings occasionally strongly brownish; length about 12 mm.; flies in late spring (46) *japonica*
 Mesoscutum covered with long, greyish or pale yellowish brown hairs, intermixed with sparse brown ones, strongly and rather sparsely punctured; metasoma smooth and very shiny, apparently less punctate than in *japonica*, with posterior margins of 1st to 4th metasomal terga reflected apically but not sharply constricted as in *japonica*; wings slightly brownish subhyaline; length about or less than 12 mm.; flies in early spring (47) *fukaii*
13. Tibial scopa considerably well developed, composed of long, dense, branched hairs; femoral floccus also branched; trochanteral floccus perfect, long and dense 14
 Tibial scopa as well as femoral floccus composed of principally simple hairs 17

14. Head elongate; clypeus protuberant, smooth, shiny, weakly and sparsely punctate; process of labrum large, semicircular; labial and maxillary palpi elongate; malar space about as long as broad; facial fovea long, rather narrow, deeply impressed; mesoscutum covered with rather short and shorn, not specially dense, yellowish brown hairs, weakly and sparsely punctate; propodeal enclosure poorly indicated, finely sculptured; tibial scopa whitish in front, sooty brown behind; metasoma oblong, nearly smooth and weakly punctate, scanty of hairs, without distinct tergal hair bands; length 10-12 mm. (56) (*Stenomelissa*) *halictoides*
 Head broader than long, more or less round in front view; clypeus not protuberant 15
15. Head and thorax densely covered with long, dull yellowish brown hairs; hairs on the rest of body almost concolorous with those on thorax or more yellowish; tibial scopa and caudal fimbria dull golden; clypeus dull, nearly shagreened with an indication of close and roughened punctures; facial fovea with upper end deep fuscous, round, deep and sharply indicated; metasoma hairy, weakly to distinctly tessellate with roughened punctures, posterior depressions of metasomal terga well indicated, without distinct hair fringes but hairs slightly denser than elsewhere; wings hyaline, pterostigma and veins yellowish; length about or slightly over 10 mm. (18) (*Chlorandrena*) *taraxaci chikuzenensis*
 Head and thorax rather densely covered with more or less short, yellowish brown hairs; metasoma scanty of hairs, nearly smooth and with weak punctures, without roughened punctures, posterior depressions of terga weakly indicated, sparsely fringed with short decumbent hairs; clypeus at least shiny anteriorly; wings dusky, pterostigma and veins yellowish brown; slender and slightly smaller, length about 9 mm. (*Chrysandrena*) 16
16. Process of labrum rather small, transverse, with apical margin entire; mesoscutum shiny, coarsely punctate with punctures irregular in distribution; 1st metasomal tergum bare, smooth and shiny, scattered with microscopical fine punctures; 2nd and following terga nearly smooth and shiny, with very weak punctures (19) *knuthi*
 Process of labrum transverse, shorter than in *knuthi*; mesoscutum shiny, more or less densely punctate with punctures a little smaller than in *knuthi*; 1st metasomal tergum bare, smooth and shiny, less punctate than in *knuthi*; 2nd and following terga slightly more punctate than in *knuthi* (20) *knuthi okinawana*
17. Third submarginal cell receiving 2nd recurrent vein at end of cell or quite close to it; head distinctly transverse in front view, with facial quadrangle about as long as broad; orbits large and much broader than cheeks seen in profile; clypeus slightly convex, smooth nearly all over, therefore distinctly shiny, with sparse and weak punctures; dorsal face of propodeum smooth and shiny near enclosure; enclosure of propodeum large, poorly indicated, rugulose basally and tessellate apically; dorsal fringe of propodeal corbicula long, dense, well arranged; interior of corbicula with long, sparse

hairs; trochanteral floccus perfect, with long, well curled, scanty hairs; tibial scopa compact; 1st metasomal tergum nearly polished, scattered with microscopical fine punctures; 2nd and following terga nearly smooth, more or less densely acupunctate, posterior margins of 2nd to 4th metasomal terga with sparse hair fringes; rather small and slender species, length about 8 mm.

..... (33) (*Habromelissa*) *omogenis*

Third submarginal cell receiving 2nd recurrent vein much before end of cell 18

18. Mid basitarsi strongly expanded medially, subequal to or broader than hind basitarsi which are widened subbasally; hind tibia more or less short, dilated apically, with hairs on outer face rather short to short; thorax with long, abundant, rather coarse hairs; enclosure of propodeum poorly indicated, finely sculptured or rugulose basally; propodeal corbicula well developed with dorsal fringe of long, dense, well arranged hairs; interior of corbicula with coarse simple hairs anteriorly, broadly free of hairs posteriorly; trochanteral floccus imperfect, rather dense, well curled; disc of 1st metasomal tergum with long, coarse hairs which are downy near posterior margin; posterior margins of 2nd to 4th metasomal terga each with a broad, complete band of appressed to ducumbent hairs; medium-sized species (*Cnemidandrena*) 19

Mid basitarsi slender, not widened or at most only slightly so medially 21

19. Hairs on mesoscutum uniformly pale fulvous; clypeus tessellate all over, therefore dull, more or less coarsely punctured; flagellum beneath broadly ferruginous; 1st and 2nd terga densely covered with long, pale fulvous hairs; 3rd and 4th with hairs paler, suberect; hairs on metasoma becoming paler toward caudal fimbria which is whitish, narrowly golden medially; metasoma not mixed with brown or blackish hairs; tibial scopa pale, uniform in colour; length 10-11 mm. (60) *albicaudata*

Hairs on mesoscutum not uniform in colour, intermixed with blackish ones; at least lower portion of clypeus smooth and shiny..... 20

20. Medium-sized species, length 10-11 mm.; process of labrum deeply emarginate and reflected apically; facial fovea rather short with lower end more or less sharply indicated, not exceeding below beyond line running lower margins of antennal sockets; flagellum beneath ferruginous; mesoscutum densely tessellate, therefore dull or nearly so, with weak and sparse punctures, covered with blackish hairs medially; hairs on outer faces of mid and hind basitarsi brown; hind basitarsi widest subbasally, tapering apically; metasomal hair bands yellowish grey, considerably broad, not specially appressed.....(21) *seneciorum*

Smaller, length 9-10 mm.; process of labrum rugulose, only slightly emarginate apically, hardly reflected; facial fovea with lower end not distinctly indicated, slightly exceeding below beyond line running lower margins of antennal sockets; flagellum beneath yellowish brown or more yellowish; mesoscutum less tessellate,

- therefore a little more shiny, covered with brown to fuscous hairs medially; scutellum broadly nearly smooth, shiny, scattered with weak punctures; hairs on outer faces of mid and hind basitarsi yellowish to slightly brownish; hind basitarsi more distinctly tapering to apices; metasomal hair bands whitish, narrower (although conspicuous), composed of well appressed hairs (22) *maeta*
21. First metasomal tergum densely, 2nd a little more sparsely, 3rd more sparsely, finely punctate; metasoma scanty of hairs, without distinct hair fringes; posterior margins of metasomal terga yellowish transparent; clypeus densely tessellate, dull, sparsely and more or less weakly punctate, with a median, longitudinal, broad, impunctate space; antennae short, swollen toward apical segments, with 3rd antennal segment one and one-half times as long as broad, about as long as 4th plus 5th; mesoscutum tessellate, more or less weakly punctate, covered with rather short, pale fulvous hairs; propodeal enclosure well indicated, distinctly wrinkled all over; propodeum outside enclosure densely rugulose or nearly shagreened; scopa and caudal fimbria bright fulvous; hind tibiae and tarsi, and mid and fore tarsi ferruginous; robust species, length about or less than 8 mm. (53) (*Poecilandrena*) *fukuokensis*
- First tergum impunctate or nearly so, if densely punctate, then larger and without combination of characters listed above 22
22. Metasoma with integument densely tessellate, therefore dull, impunctate or with an indication of very weak, sparse punctures; metasoma scanty of hairs, usually with sparse, long, erect to sub-erect, pale hairs on 1st tergum and median base of 2nd; posterior margins of 3rd and 4th metasomal terga each with a complete, narrow band of short, dense, appressed, white hairs; similar hair fringe present on posterior margin of 2nd tergum, rarely lacking; process of labrum nearly flat, transverse, with apical margin entire; clypeus rather strongly punctate with a median, longitudinal, raised, impunctate space; propodeal enclosure finely sculptured or sometimes rugulose basally; propodeal corbicula with dorsal fringe of long, dense, not specially well arranged hairs, no fringe of hairs anteriorly, interior of corbicula with sparse, usually coarse, simple hairs throughout; trochanteral floccus imperfect, short and scanty; tibial scopa well developed; medium-sized to large, robust species (*Hoplandrena*) 23
- Metasoma with integument either smooth or distinctly punctate; if metasoma tessellate and impunctate as in *Andrena* s. str., and some species of *Euandrena*, then appressed tergal hair bands lacking and/or propodeal corbicula without coarse hairs on interior 26
23. Metasoma ferruginous basally; 2nd metasomal tergum without hair fringe posteriorly; hairs on sides of face, frons, vertex, cheeks above near eyes, mesoscutum and scutellum nearly fuscous, those on the rest of head and thorax nearly dull white; tibial scopa fuscous, narrowly nearly silver white in front; mesoscutum tessellate, with punctures indistinct; length 11-12 mm. (39) *sachalinensis*

- Metasoma black; 2nd metasomal tergum with hair fringes posteriorly 24
24. Hairs on thorax primarily fulvous, bright above, paler below, not mixed with brown ones or rarely hairs darkened on median portion of mesoscutum; tibial scopa brownish to fuscous above, silvery in front; hairs on inner sides of hind tibiae and basitarsi brownish to occasionally nearly fuscous; clypeus rather strongly to strongly punctate, broadly shiny medially; mesoscutum densely tessellate (therefore dull) and weakly punctate in 1st generation, less tessellate and more punctate in 2nd; enclosure rugulose basally; metasoma frequently with an indication of very weak punctures; length about or less than 12 mm. (40) *pruniphora*
- Hairs on mesoscutum and scutellum either blackened or brownish to dark yellowish brown, those on the rest of thorax white or nearly so; enclosure of propodeum finely sculptured, at most granular basally; hairs on inner sides of hind tibiae and basitarsi paler, at most only slightly brownish 25
25. Mesoscutum covered with sparse, black or blackened hairs, tessellate, scattered with weak punctures; clypeus strongly and coarsely punctate, with interspaces frequently weakly tessellate; tibial scopa broadly silvery, slightly brownish behind; length about or less than 12 mm. (38) *miyamotoi*
- Mesoscutum covered with brownish to dark yellowish brown hairs, tessellate, more distinctly punctate with punctures slightly denser and coarser than in *miyamotoi*; clypeus slightly more coarsely punctate with interspaces shiny; tibial scopa brownish or occasionally nearly fuscous above, silver white in front; length 12-13 mm. (37) *dentata*
26. Metasoma tessellate, impunctate, dull or slightly shiny, usually densely hairy on all terga, lacking appressed hair bands, but hairs becoming slightly denser on posterior margins of terga; sometimes hairs on metasomal terga scanty but at least long hairs present on 1st tergum; propodeal corbicula well developed, with dorsal fringe of long, dense, well arranged hairs, usually with a fringe of hairs on anterior margin, interior of corbicula free of hairs posteriorly; trochanteral floccus perfect, well developed; tibial scopa compact, rarely composed of short, fine hairs; thorax with or without black pubescence; propodeal enclosure usually finely sculptured, sometimes rugulose or wrinkled basally; rather small to large species (*Andrena s. str.*) 27
- Metasoma smooth and/or distinctly punctate; if metasoma tessellate and impunctate, then trochanteral floccus imperfect and scanty 40
27. Hind tibia with anterior margin emarginate; tibial scopa with hairs on outer face rather short to short, fine, whitish; middle basitarsi slightly wider than hind basitarsi; malar space about one-fourth time as long as base of mandible; clypeus densely tessellate except for medio-anterior portion where polished and sparsely punctate; facial fovea broad, short, nearly fuscous; mesoscutum densely

tessellate, dull, with an indication of weak punctures, covered with pale yellowish brown hairs not obscure integument; metasoma not specially hairy; hind tibiae and tarsi brownish; length 10-11 mm.

..... (1) *brevihirtiscopa*

Hind tibia normal, with tibial scopa composed of rather coarse to coarse, long hairs 28

28. Head, thorax and basal metasomal terga with abundant long black hairs which obscure integument, or at least hairs on head and thorax black; hairs on metasoma long, dense, black and fulvous or rarely all fulvous 29

Thorax and basal metasomal terga without black hairs; or if occasionally blackish hairs present on thorax above, then hairs on mesopleura primarily whitish..... 30

29. Large species, length 13-15 mm.; clypeus elongate, much exceeding line running bases of eyes, irregularly and rather sparsely punctate, with a median, raised, impunctate space, shiny; hairs on metasoma long, dense, obscure integument, those on two or three basal terga black, those on the rest of terga dull fulvous, or occasionally hairs on metasoma all fulvous; hairs on legs nearly all black including tibial scopa which is composed of long, coarse, rather loose, simple hairs; legs piceous or nearly black..... (2) *mikado* (cf. No. 31)

Smaller, length 11-12 mm.; clypeus elongate but slightly less exceeding below than in *mikado*; metasoma condensed oval, with hairs long, dense, well obscure integument, those on basal two or three metasomal terga black, those on the rest of terga fulvous, or rarely hairs on metasoma all fulvous; hairs on fore and mid legs and coxae and trochanters of hind legs fuscous, those on the rest of terga fulvous, or rarely hairs on metasoma all fulvous; hairs on fore and mid legs and coxae and trochanters of hind legs fuscous, those on the rest of legs sooty fulvous to sooty golden; tibial scopa sooty golden, compact, composed of long, dense, well arranged, simple hairs; hairs of tibial scopa much less coarse than in *mikado*; legs piceous with tibiae and tarsi of hind legs ferruginous..... (3) *bombiformis*

30. Hairs on legs primarily fuscous to black including trochanteral floccus and tibial scopa; hairs on head abundant, principally black, those on thorax above abundant, long fulvous 31

Hairs on legs paler; trochanteral floccus white or whitish, occasionally yellowish; tibial scopa at least silver white in front 32

31. Large species, length 13-15 mm. or occasionally slightly smaller; clypeus elongate, much exceeding line running bases of eyes; hairs on metasoma abundant, long fulvous or dull fulvous including scanty caudal fimbria; femoral floccus fuscous or nearly black; tibial scopa large, composed of long, rather loose, coarse, simple hairs..... (2) *mikado* var. (cf. No. 29)

Smaller, length about 12 mm.; clypeus much less exceeding line running bases of eyes than in *mikado*, well convex, densely tessellate all over, coarsely and rather densely punctate; process of labrum rather small, bilobed apically; hairs on mesopleura

primarily black; hairs on metasoma rather fine, long and pale fulvous basally, shorter and occasionally brownish apically, becoming downy and forming an indistinct, pale hair fringe on posterior margins of intermediate terga; caudal fimbria black; tibial scopa compact, composed of dense, well arranged, simple hairs (4) *ishiharai*

32. Hairs on metasoma pale fulvous to fulvous, rather dense to dense 33

Hairs on metasoma primarily whitish or rarely brownish on apical terga, scanty 34

33. Rather large and robust, length 11-12 mm.; hairs on head sooty fulvous and fuscous, long, dense, those on thorax fulvous, long, dense, obscure integument, those on metasoma fulvous, rather long to long, dense, primarily erect, becoming downy and forming a loose, obscure band on posterior margins of intermediate terga; clypeus much exceeding line running bases of eyes, shiny, malar space about two-sevenths time as long as base of mandible; mesoscutum densely tessellate, entirely dull; legs piceous with hind tibiae and tarsi reddish brown to ferruginous; hairs on legs, except for fuscous to brownish ones on tibiae and tarsi of fore and mid legs, primarily yellowish; tibial scopa sooty golden, sometimes slightly brownish above basally..... (5) *nawai*

Slightly slender, length about 11 mm.; hairs on head pale and fuscous, those on thorax nearly fulvous above, paler below, mixed with sparse brownish ones on mesoscutum, not obscure integument, those on metasoma not specially long; clypeus slightly exceeding line running bases of eyes, sparsely, coarsely and strongly punctate; malar space about one-fourth time as long as base of mandible; mesoscutum broadly nearly smooth medially, therefore shiny, weakly punctate; legs piceous with hind tibiae and mid tarsi reddish brown; mid basitarsi broad, subequal to rather broad hind basitarsi in width; hairs on legs primarily whitish to yellowish; tibial scopa creamy white (6) *esakii*

34. Hind tibia slender, elongate, scarcely dilated apically; tibial scopa large, composed of long, loose, not well arranged, coarse, simple hairs; tibial scopa silver white in front, brownish to fuscous behind; clypeus strongly convex, more or less well exceeding line running bases of eyes, nearly smooth and rather broadly impunctate medio-apically, with an indication of median, longitudinal, impunctate, raised space; malar space rather narrow, about one-fifth time as long as base of mandible; mesoscutum densely tessellate, nearly dull, with weak and rather sparse punctures; hairs on thorax greyish white or occasionally indistinctly yellowish above, not specially dense; dorsal fringe of propodeal corbicula rather scanty; enclosure of propodeum broadly rugose basally; form slender, length 12 mm. (7) *longitibialis*

Hind tibiae normal; tibial scopa compact, composed of well arranged hairs except for *shirozui* in which it is rather loose 35

35. Head, seen in front, rather round with facial quadrangel distinctly longer than broad; clypeus much exceeding line running bases of eyes; hairs on thorax nearly uniformly yellowish or pale fulvous,

- only slightly paler below, not mixed with brownish ones; hairs on propodeum, especially dorsal fringe of propodeal corbícula, long, dense 36
- Head, seen in front, broader than long, with facial quadrangle only slightly longer than broad; clypeus slightly exceeding line running bases of eyes; if rarely head more or less round in front view and clypeus rather well exceeding line running bases of eyes, then brownish to fuscous hairs present on thorax and metasoma 37
36. Hairs on head primarily fuscous except for paler hairs on occiput and cheeks behind; clypeus broadly smooth anteriorly, sparsely punctate; malar space one-third time as long as base of mandible or occasionally more longer; hairs on thorax long; tibial scopa large, composed of long, rather loose, slightly coarse, simple hairs; tibial scopa creamy white, more silvery in front and slightly brownish above; caudal fimbria brown (9) *shirozui*
- Hairs on head paler, those on face including clypeus, vertex, occiput and cheeks pale, those on sides of face, frons and cheeks above near eyes fuscous; clypeus well convex, slightly less exceeding line running bases of eyes than in *shirozui*, slightly more densely punctate; malar space narrower, less than one-fourth time as long as base of mandible; hairs on thorax, especially those on mesoscutum, shorter than in *shirozui*; tibial scopa rather large, composed of long, rather well arranged, rather coarse, simple hairs; tibial scopa creamy white; caudal fimbria sooty golden or occasionally a little brownish (8) *maukensis*
37. Hairs on thorax above primarily fuscous or at least fuscous hairs present on mesoscutum; clypeus well convex, shiny and sparsely punctate apically; malar space about or more than one-fourth time as long as base of mandible; mesoscutum densely tessellate, with an indication of weak punctures, entirely dull; enclosure of propodeum finely sculptured all over or occasionally rugulose basally; tibial scopa not large, silver white in front, brownish to nearly black above; caudal fimbria fuscous to nearly black (11) *aburana*
- Hairs on thorax dull fulvous or paler, not mixed with brownish ones except for *benefica* in which sparse brownish hairs present on mesoscutum; malar space narrower, less than one-fourth time as long as base of mandible 38
38. Face including clypeus densely covered with rather long, dull greyish white hairs; hairs on sides of face, frons, and cheeks above fuscous; facial fovea deep fuscous or nearly black; hairs on thorax dull yellowish grey above, whitish below, rather long and dense, not distinctly obscure integument; hairs on basal metasomal terga long, those on apical terga short, fine, whitish; caudal fimbria brown; tibial scopa compact, silver white in front, brownish behind; process of labrum strongly tapering toward apex, nearly polished, apical margin entire; clypeus tessellate all over or narrowly nearly smooth medio-apically, densely punctate with punctures becoming slightly sparser and stronger toward apex, almost without a median, longitudinal, impunctate line; mesoscutum densely tessellate, with

an indication of weak punctures, dull; enclosure of propodeum rugose basally; metasoma densely tessellate, apical terga slightly shiny; length about 10 mm. (10) *hondoica*

Face including clypeus sparsely covered with whitish or slightly yellowish hairs; clypeus sparsely punctate, especially so anteriorly, with punctures rather coarse and irregular in distribution, with an indication of median, longitudinal, impunctate space; process of labrum with apical margins rather broad, emarginate or entire 39

39. Length about 10.5 mm.; process of labrum transverse, with apical margin nearly entire; clypeus tessellate all over, feebly shiny, coarsely punctate; mesoscutum densely tessellate, rather densely to densely, weakly punctate; enclosure of propodeum shagreened basally; metasoma tessellate, slightly shiny; hairs on head and thorax sooty, pale to dull fulvous; hairs on mesoscutum rather short and not dense; caudal fimbria slightly brownish; tibial scopa silvery or pale creamy white, slightly brownish above basally (12) *saragamineensis*

Length less than 10 mm.; process of labrum with apical margin emarginate; clypeus broadly nearly smooth medio-anteriorly where broadly impunctate or with punctures sparse; mesoscutum densely tessellate, with an indication of weak and sparse punctures, nearly dull; enclosure of propodeum rugulose basally; metasoma tessellate, weakly shiny; hairs on face and cheeks whitish, those on thorax very pale yellowish brown above, whitish below, mixed with sparse brownish hairs on mesoscutum; hairs on metasoma whitish, forming an obscure fringe on posterior margins of intermediate terga; caudal fimbria bright, yellowish; tibial scopa silver white, occasionally narrowly brownish above basally (13) *benefica*

40. Posterior spur of hind tibia widened and curved near base; usually rather large and robust species 41

Posterior spur of hind tibia at most gently curved, neither widened nor curved near base 44

41. Enclosure of propodeum large, well indicated, sparsely wrinkled; propodeum outside enclosure densely tessellate and densely rugose; interior of propodeal corbicula with sparse, fine hairs throughout; metasoma shiny with sparse and very weak punctures, scanty of hairs, posterior margins of terga well indicated, with lateral fringes of short, whitish hairs; caudal fimbria brown; hind tibiae and tarsi ferruginous..... (52) (*Plastandrena*) *astragalina* (cf. No. 11)

Enclosure of propodeum nearly triangular, more or less well defined, rather large to small, rugose to coarsely sculptured; propodeum short, strongly slanting; propodeum outside enclosure densely to quite densely punctate; dorsal fringe of propodeal corbicula short, not specially dense; interior of corbicula with coarse, simple hairs throughout, no fringe of hairs anteriorly; trochanteral floccus nearly perfect to perfect, dense; tibial scopa compact; metasoma either strongly or very weakly punctate, with or without hair bands; facial fovea separated from eye margin by a narrow,

- raised, punctate space; process of labrum large, distinctly emarginate apically (*Holandrena*) 42
42. Species from Hokkaido (common), Honshu (rare) and Tsushima (rare); length about or slightly over 12 mm.; clypeus broadly nearly flat, strongly subrugoso-punctate; mesoscutum and scutellum tessellate, strongly punctate with punctures irregular in distribution; propodeum outside enclosure coarsely sculptured with an indication of quite close punctures; metasoma distinctly and very densely punctate with punctures on 1st tergum stronger and slightly sparser than those on following terga; hairs on head, thorax and metasoma nearly uniformly white, those on metasomal terga short, primarily erect, fine; posterior margins of 1st to 4th metasomal terga each with a white band of short, appressed hairs; caudal fimbria brownish; tibial scopa silver white, compact, composed of more or less short, coarse, simple hairs..... (34) *vareliana*
- Species from Amami-Oshima; clypeus broadly convex; enclosure of propodeum small, rugose to rugulose apically; propodeum outside enclosure with distinct punctures nearly as in *labialis* (Kirby); metasoma strongly shiny, with weak to very weak punctures, with or without hair bands; posterior spur of hind tibia only slightly widened and slightly curved near base; length about or slightly less than 13 mm. 43
43. Hairs on full body nearly uniformly bright yellowish brown except for brown caudal fimbria; metasoma especially strongly shiny, finely and sparsely punctate; posterior margins of 2nd to 4th terga each with a complete or nearly complete band of short, dense, yellowish hairs; similar hair fringes present on posterior margin of 1st tergum; tibial scopa bright, nearly golden, narrowly brown above basally (35) *ishikawai*
- Hairs on mesoscutum, scutellum and metanotum primarily fuscous, those on the rest of thorax whitish; metasoma less shiny and a little more punctate than in *ishikawai*, without any trace of hair band; caudal fimbria fuscous; tibial scopa fuscous, slightly paler anteriorly..... (36) *taniguchiae*
44. Propodeal corbicula quite well developed, with dorsal fringe of long, dense, well arranged, curled hairs, interior of corbicula free of hairs medially, with a complete fringe of hairs anteriorly; trochanteral floccus imperfect, dense; tibial scopa composed of rather short to short, fine hairs; hind tibiae rather short, dilated apically; enclosure of propodeum coarsely sculptured for Japanese species (*Simandrena*) 45
- Propodeal corbicula poorly developed or at most moderately so, usually hairy on interior, without a fringe of hairs anteriorly; hind tibia normal 46
45. Length 9-11 mm.; thorax covered with primarily pale yellowish brown hairs, frequently intermixed with brownish hairs on mesoscutum; propodeum elongate, with lateral margin distinctly convergent posteriorly; metasomal terga, especially 1st and 2nd, finely tessellate, feebly shiny, with an indication of very fine punctures;

posterior margins of intermediate metasomal terga with white, dense hair bands; tibial scopa silvery or sometimes slightly yellowish..... (54) *opacifovea*

Length 8-10 mm.; thorax covered with fulvous hairs above, paler below; propodeum shorter, not distinctly convergent posteriorly as in *opacifovea*; metasomal terga including 1st tergum densely punctate with punctures much stronger than in *opacifovea*; tergal hair bands very dense, white or slightly yellowish; tibial scopa bright, yellowish..... (55) *kerniac*

46. Propodeal corbicula moderately well developed, with dorsal fringe of long, dense, rather well to well arranged hairs, interior of corbicula with coarse, simple hairs throughout, no complete fringe of hairs anteriorly, but frequently sparse branched hairs present on dorsal portion of anterior margin; trochanteral floccus imperfect, scanty to dense; tibial scopa compact, well developed; facial fovea separated from eye by a narrow punctate space; medium-sized to large, robust species..... 17

Propodeal corbicula poorly developed with dorsal fringe of short scanty hairs; if propodeal corbicula more or less well developed, then insects without combination of characters listed above 52

47. Thorax densely covered with dull pale fulvous hairs which slightly obscure integument, more or less short on mesoscutum, becoming slightly paler downwards; hairs on clypeus pale, those on antennal regions sooty fulvous, those on frons and vertex brownish; process of labrum broad, semicircular; clypeus shiny, densely and rather coarsely punctate, without an indication of median, longitudinal, impunctate line; mesoscutum densely tessellate, with an indication of weak punctures, dull; enclosure of propodeum rugose basally, granulate apically; 1st metasomal tergum tessellate with roughened punctures, 2nd and following terga less tessellate with dense, weak, more or less roughened punctures; hairs on 1st and median base of 2nd terga long, yellowish, those on the rest of 2nd and following terga short, dense, erect to suberect, fine, brownish; posterior margins of 2nd to 4th terga each with a complete or nearly complete, narrow band of decumbent to appressed, short, slightly yellowish hairs; hairs on posterior margin of 1st downy, not forming hair band; length 12-13 mm. (32) (?*Gymnandrena*) *sasaki*

Thorax with hairs variable, dull white, fulvous, or black; propodeum outside enclosure roughened, usually more coarsely sculptured than apical portion of enclosure; metasomal terga smooth or nearly so, usually distinctly punctate with punctures not at all roughened, or occasionally punctures weak or nearly absent; metasoma scanty of hairs, at least discs of 1st and 2nd terga bare (or very short and fine hairs present in *edashigei*); metasomal terga with or without hair bands (*Gymnandrena*)..... 48

48. Large species, length 13-14 mm.; clypeus broadly and strongly convex, densely and coarsely rugoso-punctate, without an indication of median, longitudinal, impunctate line; mesoscutum roughened

anteriorly, densely punctate and shiny medio-posteriorly; enclosure of propodeum well indicated, wrinkled basally, finely sculptured elsewhere; metasoma broad, deep shiny black, finely punctate; posterior depressions of intermediate terga very broad, without any trace of hair band; trochanteral floccus white, femoral floccus white, hairs on dorsal margin densely branched; tibial scopa as well as caudal fimbria black (29) *parathoracica*

Metasoma with conspicuous hair bands or at least with distinct hair patches 49

49. Thorax covered with primarily fulvous hairs 50

Thorax covered with dull white or dull white and black hairs..... 51

50. Species from Hokkaido; process of labrum flat, shiny, deeply emarginate apically; clypeus moderately well convex, densely and coarsely rugoso-punctate, dull; hairs on mesoscutum sparse medially, sparsely mixed with brownish ones; metasoma weakly shiny, 1st and 2nd terga densely and distinctly punctate, 3rd less, and 4th much less punctate; tergal hair bands broad, appressed, white; caudal fimbria fuscous; tibial scopa silver white in front, fuscous behind (30) *okabei sapporensis*

Species from Amami-Oshima; process of labrum transverse, slightly emarginate apically; clypeus exceedingly strongly convex medially, densely subrugoso-punctate, shiny; mesoscutum and scutellum with fuscous hairs medially; metasoma shiny, finely and densely punctate with punctures on 1st tergum sparser and weaker than those on following terga; tergal hair bands rather narrow to more or less broad, dense, yellowish; caudal fimbria deep fuscous; tibial scopa fuscous, narrowly silvery or yellowish in front..... (31) *edashigei*

51. Mesoscutum and scutellum covered with primarily blackish hairs, the rest of thorax with dull white hairs; clypeus well convex, strongly rugoso-punctate with an indication of median, longitudinal, raised, impunctate space which is sometimes obscure; mesoscutum dull or nearly so, densely punctate; enclosure of propodeum wrinkled or coarsely sculptured; propodeum outside enclosure strongly roughened; metasoma dull or slightly shiny, densely and distinctly punctate with punctures on 1st tergum slightly stronger and sparser than those on 2nd; posterior depressions of intermediate terga very broad, not sharply indicated medially, with white, appressed, lateral (complete on 4th) hair bands; caudal fimbria deep fuscous, tibial scopa brownish to fuscous, silver white in front; length 12-14 mm.(27) *watasei*

Hairs on thorax primarily dull white, not mixed with fuscous ones, those on mesoscutum short, rather coarse, sparse posteriorly; clypeus well convex, coarsely subrugoso-punctate, without an indication of median, impunctate space, dull; mesoscutum broadly nearly smooth, sparsely punctate posteriorly; enclosure of propodeum coarsely wrinkled; metasoma shiny, rather weakly and sparsely punctate; posterior depressions of intermediate metasomal terga well indicated, with white, broad, lateral hair fringes; caudal

- fimbria nearly fuscous; tibial scopa black; length 14-15 mm.
(28) *wulungshanensis*
52. Dorsal fringe of propodeal corbícula rather well indicated but not well developed, rather short and not specially dense; interior of corbícula with sparse, coarse, simple hairs nearly throughout, no fringe of hairs on anterior margin; trochanteral floccus perfect, dense; metasoma smooth and shiny, weakly to very weakly punctate; postocelli close each other, distance between them equal to or a little longer than ocelloccipital distance; species from Amami-Oshima Islands 43
- Propodeal corbícula with soft, fine hairs on interior; or if coarse hairs present on interior, then insects without combination of characters listed above 53
53. Metasoma condensed oval, densely tessellate-punctate, nearly dull or weakly shiny, posterior margins of intermediate terga with narrow, appressed, pure white hair bands, those of 3rd and 4th terga complete; head broad and thin, nearly round in front view; clypeus hardly convex, tessellate, coarsely rugoso-punctate; process of labrum short, transverse, apex narrowly bilobed; mesoscutum tessellate, rather densely punctate, covered with short, dull, pale yellowish brown hairs; propodeum roughened, with enclosure poorly defined, rugose basally, granulate apically; trochanteral floccus nearly perfect, white; tibial scopa silver white, narrowly brownish above basally, composed of rather coarse hairs; length about or less than 11 mm. (57) (*Taeniandrena*) *ezoensis*
- Metasoma elliptical or elongate, smooth and shiny; if metasomal terga tessellate as in some species of *Euandrena*, then insects without combination of characters listed above 54
54. Metasoma tessellate or at least weakly so, therefore nearly dull or weakly shiny, impunctate except for *takachihoi* in which weak punctures present; metasomal terga more or less hairy, posterior margins of intermediate terga with loose to more or less compact hair fringes; propodeal corbícula poorly developed, with dorsal fringe of loose or more or less well arranged, rather long hairs, interior with sparse fine hairs; trochanteral floccus imperfect, scanty; tibial scopa well developed; dorsal face of propodeum shagreened to roughened; propodeal enclosure finely to rather finely sculptured, usually less coarsely sculptured than dorsal face of propodeum except for *stellaria* in which it is broadly roughened; facial fovea rather narrow, with upper end occupying about or less than one-half of distance between eye and postocellus; head and thorax with rather abundant, not specially long hairs; rather small species (*Euandrena*) 55
- Metasoma scanty of hairs, at least 1st tergum bare dorsally; metasomal terga, especially basal ones, smooth and shiny; or if rarely metasomal terga very finely tessellate, then insects without combination of characters listed above 58
55. Tibiae and tarsi of hind legs ferruginous with hairs golden; small segments as well as apices of hind basitarsi slightly darkened;

basitarsi of mid legs and small segments of hind tarsi brownish; process of labrum trapezoid, with apical margin entire; clypeus tessellate, lower portion smoother, more or less densely punctate, without an indication of median, impunctate line; facial fovea short, deep fuscous; mesoscutum densely tessellate, dull, with more or less distinct punctures medially; propodeal enclosure ill defined, narrowly rugose basally; propodeum outside enclosure with an indication of more or less roughened punctures; hairs on face including clypeus and cheeks long, rather dense, sooty, those on sides of face and frons fuscous; hairs on thorax dull pale yellowish brown above, paler below, not mixed with darker ones; hairs on metasoma whitish, forming loose, broad fringes on posterior depressions of intermediate terga; caudal fimbria brown; length less than 10 mm.(25) *ruficrus rabicrus*

Legs black or piceous, not reddened; tibial scopa large, composed of long, not specially compactly arranged hairs56

56. Species flies in autumn; process of labrum trapezoid, shiny; clypeus broadly convex, tessellate above and laterally, strongly and coarsely punctate; facial fovea deep fuscous, narrow and well indicated beneath, separated from eye by a more or less wide, punctate space; mesoscutum densely tessellate, rather densely punctate, with punctures occasionally somewhat roughened, much weaker than those on clypeus; enclosure of propodeum finely granular, much less coarsely sculptured than dorsal face of propodeum; 1st tergum nearly smooth, shiny, with weak, slightly roughened punctures; 2nd weakly tessellate and weakly punctate, a little less shiny; 3rd and 4th more distinctly tessellate; hairs on thorax dull, yellowish grey above, whitish below; posterior margins of 2nd to 4th metasomal terga each with a nearly complete, rather broad, loose band of decumbent, whitish hairs; caudal fimbria fuscous; hairs on tibiae and tarsi fuscous including tibial scopa occasionally slightly paler anteriorly, composed of long, rather loose, more or less coarse, simple hairs; length 9-10 mm.(26) *takachihoi*

Species fly in spring; metasoma, especially 1st tergum, apparently more tessellate, impunctate; tibial scopa largely silvery white 57

57. Clypeus well convex and slightly elongate, well exceeding line running bases of eyes, broadly smooth and shiny, sparsely, and rather coarsely punctate, almost without an indication of median impunctate space; malar space a little more than one-fourth time as long as base of mandible; mesoscutum densely tessellate, dull, with an indication of weak punctures; propodeal enclosure slightly roughened basally, densely tessellate or granulate apically; hairs on head sooty to fuscous, those on thorax dull fulvous above, paler below, not mixed with darker ones, those on metasoma whitish; posterior margins of 2nd to 4th metasomal terga with narrow, decumbent, loose hair fringes; caudal fimbria brown; length about 9 mm.(23) *hebes*

- Clypeus less broadly smooth, less strongly punctate with an indication of median, longitudinal, broad, impunctate space; malar space narrower, about one-fifth time as long as base of mandible; mesoscutum slightly less tessellate medially than in *hebes*; enclosure of propodeum more broadly rugose basally; hairs on head and thorax paler, yellowish grey on thorax above; posterior margins of 2nd to 4th metasomal terga each with a nearly complete fringe of rather compact (denser than in *hebes*), not appressed hairs; caudal fimbria pale brown; length about 9 mm. (24) *stellaria*
58. Mesopleura coarsely sculptured or at least rugose above or with distinct punctures; dorsal face of propodeum coarsely sculptured or at least shagreened; dorsal fringe of propodeal corbicula long, rather well to well arranged; trochanteral floccus perfect except for *nitidiuscula*; metasoma scanty of hairs, very shiny, with appressed hair bands on intermediate terga (*Notandrena* and its allies) 59
- Mesopleura finely tessellate, with or without weak, well separated small punctures, dorsal face of propodeum nearly smooth or at most densely tessellate, with weak, well separated, small punctures except for *kamikochiana*; dorsal fringe of propodeal corbicula poor, composed of rather short to short, rather sparse to sparse hairs; outer faces of propodeum with very fine (*mitakensis*-group) or fine to a little coarse (*prostomias* group) hairs; trochanteral floccus nearly imperfect; metasoma scanty of hairs, shiny, with appressed hair bands on intermediate terga (*Calomelissa*)..... 61
59. Species from Amami-Oshima; mesoscutum weakly tessellate, nearly dull, very densely and rather finely punctate, densely covered with short, subvelvety, yellowish brown hairs; scutellum densely punctate with hairs longer than those on mesoscutum; propodeum strongly convergent posteriorly, enclosure large, much coarsely sculptured than dorsal face of propodeum; head rather round in front view, with inner eye margins slightly convergent above; clypeus strongly convex, polished, sparsely and irregularly punctate; lower paraocular area also smooth and shiny; facial fovea very narrow beneath, separated from eye margin by a wide shiny space; metasoma polished, finely punctate; posterior margins of intermediate terga with narrow white hair fringes; form slender, length about or less than 9 mm. (50) *amamiensis*
- Thorax without such subvelvety, dense covering of hairs, weakly and sparsely punctate 60
60. Enclosure of propodeum well indicated, strongly and densely wrinkled; propodeum outside enclosure coarsely sculptured; propodeal corbicula with dorsal fringe of long, not specially dense hairs, interior of corbicula with sparse, long, coarse, simple hairs; trochanteral floccus white, perfect, dense and long; hind tibiae and tarsi reddish brown, the former elongate; tibial scopa well developed, composed of long, more or less coarse, rather compact hairs; tibial scopa silver white to slightly yellowish, slightly brownish above basally; metasoma polished and highly shiny, 1st tergum impunctate or scattered with microscopical fine punctures,

2nd and following finely punctate; 2nd to 4th terga with white hair fringes not so conspicuous; caudal fimbria bright, pale yellowish brown; process of labrum nearly as long as broad, apical margin entire; clypeus shiny, rather weakly and irregularly punctate; mesoscutum shiny, weakly punctate, covered with short, sparse, pale brownish hairs; length about or less than 11 mm. ... (49) *richardsi*

Enclosure of propodeum not sharply indicated, rugose basally; propodeum outside enclosure shagreened; dorsal fringe of propodeal corbicula rather long, well arranged, interior of corbicula with sparse, fine, simple hairs; trochanteral floccus imperfect, scanty; tibial scopa well developed, composed of rather long to long, not specially compact, slightly coarse, silver white hairs; head transverse in front view; process of labrum short, transverse; clypeus convex, weakly tessellate, rather distinctly punctate below; facial fovea separated from eye by a wide punctate space, well indicated; postocelli rather widely separated each other; mesoscutum weakly tessellate, weakly punctate; metasoma shiny, 1st tergum highly polished, 2nd and 3rd weakly punctate; posterior margins of intermediate terga with pure white, appressed hair fringes; distal halves of wings brownish; length 8 mm.

..... (48) (*Notandrena*) *nitidiuscula*

61. Facial fovea very broad, with upper end occupying full space between eye and postocellus; enclosure of propodeum large, with lateral margins convex outwardly, more coarsely sculptured than dorsal face of propodeum where weakly tessellate-punctate; mesopleura weakly tessellate with distinct, well separated punctures; tibial scopa compact, with hairs well arranged, not loose (*Calomelissa*, group of *prostomias*) 62

Facial fovea nearly black, rather deeply impressed, much narrower than the preceding group; propodeal enclosure large, subtriangular, with sides not convex outwardly; mesopleura densely tessellate, impunctate or with an indication of weak punctures; tibial scopa large, composed of long, rather loose hairs (*Calomelissa*, group of *mitakensis*) 63

62. Large species, length 12-13 mm.; head large, subquadrate in front view, with inner eye margins slightly convergent above; process of labrum small, subtriangular, convex apically; clypeus hardly convex, polished, scattered with distinct punctures; postocelli close each other, distance between them equal to ocelloccipital distance; cheeks much broader than eyes; mesoscutum and scutellum nearly smooth, weakly punctate, covered with short fuscous hairs; wings distinctly brownish (14) *prostomias*

Smaller, length about 11 mm.; head normal or slightly narrower than thorax; process of labrum transverse, with apical margin nearly entire; clypeus broadly convex, polished, scattered with coarse punctures; postocellar distance about twice as large as ocelloccipital distance; cheeks about as broad as eyes; mesoscutum and scutellum weakly tessellate, weakly punctate, covered with short, brown hairs not conspicuous (15) *tsukubana*

63. Larger, length about 11 mm., form rather slender; process of labrum triangular, not specially convex apically; postocellar distance distinctly shorter than ocelloccipital distance; mesoscutum weakly tessellate, weakly punctate, covered with brownish hairs; metasoma smooth and shiny, very finely punctate; 1st tegrum highly polished; caudal fimbria as well as tibial scopa brown or fuscous, the latter narrowly silvery in front (16) *mitakensis*

Smaller, length about or less than 8.5 mm.; process of labrum roundly convex apically; clypeus nearly shagreened with an indication of coarse punctures; postocellar distance a little shorter than ocelloccipital distance; mesoscutum densely tessellate, with an indication of weak punctures, covered with brown hairs; metasoma very finely tessellate, with an indication of sparse, very fine punctures, shiny; 1st tergum with microscopical fine lineolation; caudal fimbria blackish brown; tibial scopa brown to fuscous, narrowly nearly silver white in front..... (17) *kamikochiana*

Key to the known males of the genus *Andrena* occurring in Japan

1. Clypeus ivory white or yellow, frequently lower paraocular areas concolorous with clypeus 2
 Clypeus black 13
2. Malar space approximately as long as base of mandible; ultimate segment of antenna uncinat; slender species, with a large head, length about 9 mm. (56) *(Stenomelissa) halictoides*
 Malar space linear; ultimate segment of antenna normal..... 3
3. Second recurrent vein ending at end of 3rd submarginal cell, meeting with or nearly so with 3rd intercubital vein; clypeus ivory white with a pair of blackish spots laterally, very slightly convex, distinctly transverse, scarcely exceeding below beyond line running bases of eyes; head distinctly transverse in front view; antennae elongate with 3rd segment one and one-half times as long as broad, about as long as 4th which is shorter than 5th; length about or less than 7 mm.(33) *(Habromelissa) omogensis*
 Second recurrent vein ending much basad of 3rd intercubital vein 4
4. Clypeus ivory white medially, considerably strongly convex medio-subapically; process of labrum bilobed; mandibles long, strongly curved, with sharp falciform apices; antennae elongate, 3rd segment approximately twice as long as broad, much longer than 4th which is as long as broad and slightly shorter than 5th; cheeks angulate behind; length about or slightly over 7 mm.; species from Amami-Oshima (50) *amamiensis*
 Clypeus not strongly convex, either yellow or ivory white..... 5
5. Small species, length about 6 mm. or occasionally slightly larger; metasomal terga, including 1st tergum, finely and densely punctate;

- enclosure of propodeum coarsely sculptured; dorsal face of propodeum roughened; flagellum beneath yellowish brown; 3rd antennal segment approximately one and one-half times as long as broad, 4th much broader than long, about one-half time as long as 3rd, 5th as long as broad; tibiae and tarsi of hind legs and tarsi of mid legs ferruginous; head and thorax with yellowish hairs (53) (*Poecilandrena*) *fukuokensis*
- Larger, more than 7 mm.; if occasionally smaller, insects without combination of characters listed above 6
6. Head and thorax with abundant brown to blackish hairs or at least with admixture of brown hairs (*Calomelissa*)..... 7
- Head and thorax without admixture of brown hairs, primarily covered with yellowish hairs..... 10
7. Clypeus and face marks ivory white or only slightly yellowish; clypeus strongly transverse, scarcely exceeding below beyond line running bases of eyes; vertex strongly arched in front view (group of *mitakensis*)..... 8
- Clypeus yellow, lateral face marks usually lacking; vertex not arched or only slightly convex in front view; enclosure of propodeum large, much more coarsely sculptured than dorsal face of propodeum where tessellate with an indication of weak and rather sparse punctures (group of *prostomias*) 9
8. Larger, length about 10 mm.; process of labrum short, transverse; clypeus well convex medially; scape distinctly shiny in front; antennae with 3rd segment more than twice as long as broad, 4th segment slightly longer than broad; propodeal enclosure nearly shagreened basally; dorsal face of propodeum as well as mesopleuron tessellate with an indication of very weak punctures..... (16) *mitakensis*
- Smaller, length about or slightly over 7 mm.; process of labrum subprotuberant; clypeus only slightly convex medially; scape less shiny in front; antennae with 3rd segment twice as long as broad, 4th segment indistinctly broader than long; propodeal enclosure nearly shagreened all over; dorsal face of propodeum densely tessellate, dull, impunctate; mesopleuron slightly less tessellate than dorsal face of propodeum, with an indication of weak punctures..... (17) *kamikochiana*
9. Clypeus nearly flat or only slightly convex, scattered with weak punctures; process of labrum subprotuberant; cheeks broader than eyes; ocelloccipital distance only slightly shorter than postocellar distance; antennae with 3rd segment slightly more than one and one-half times as long as broad; 4th segment only slightly broader than long, 5th segment approximately as long as wide; larger, length about 10 mm. (14) *prostomias*
- Clypeus broadly convex, slightly more distinctly punctate; process of labrum transversely convex; cheeks at most as broad as eyes, rather receding; ocelloccipital distance much shorter than postocellar distance; antennae with 3rd segment about or slightly less than one and one-half times as long as broad; 4th segment

- distinctly broader than long, 5th segment approximately as long as broad or indistinctly broader than long; smaller, length about 8 mm. (15) *tsukubana*
10. Process of labrum rather small, not reflected at apex, slightly emarginate; enclosure of propodeum rugulose to rugose basally, tessellate apically, shiny; length about or less than 9 mm. (*Chrysandrena*) 11
- Process of labrum rather large, transverse, reflected and deeply emarginate at apex; enclosure of propodeum rugulose or wrinkled all over; length about 10 mm. (*Holandrena*) 12
11. Clypeus and occasionally lower ends of paraocular areas yellow, or sometimes yellow portion of clypeus reduced, then upper portion of clypeus black; antennae with 3rd segment about one and one-half times as long as broad, longer than 4th which is broader than long, 5th segment approximately as long as broad; head and thorax with pale to yellowish hairs; enclosure of propodeum narrowly rugulose basally; metasoma shiny, scattered with microscopical punctures (19) *knuthi*
- Clypeus and lower paraocular areas pale yellow to yellow; head and thorax with brighter yellow hairs; enclosure of propodeum more broadly rugose basally; metasoma slightly more distinctly punctate.....(20) *knuthi okinawana*
12. Species from Hokkaido, mountainous region of central Honshu and Tsushima; head large, rather thin, distinctly broader than thorax seen from above; yellow portions of paraocular areas broad, nearly reaching the upper margins of antennal sockets; clypeus rather distinctly exceeding below beyond line running bases of eyes; flagellum beneath broadly reddish brown; 3rd antennal segment more than twice as long as broad; metasoma distinctly punctate, sometimes partly red (34) *valeriana*
- Species from Amami-Oshima; head distinctly broader than long with apex of clypeus not much exceeding below beyond line running bases of eyes; flagellum obscurely brownish beneath; 3rd antennal segment one and one-half times as long as broad; yellow portion of paraocular areas narrow; metasoma shiny black, very weakly punctate..... (35) *ishikawai*
13. Antennae with 3rd segment at most as long as broad, about one-half time as long as 4th; 5th and following segments about twice as long as broad, distinctly convex in front; malar space variable in length, usually with a sharp spine posteriorly (except for *sachalinensis* and *pruniphora*) (*Hoplandrena*) 14
- Antennae with 3rd segment longer than broad; or if occasionally shorter, then insects without combination of characters listed above 18
14. Malar space with sharp spine posteriorly; mandibles long, curved, with sharp falciform apices 15
- Malar space without spine but sharply angled posteriorly; mandibles not elongate, without falciform apices..... 17

15. Antennae with 4th segment about equal to or only slightly longer than 5th; head, including face and clypeus, and thorax covered with long, rather dense, pale fulvous hairs, not mixed with darker hairs except for sparse brownish ones on sides of face, frons and cheeks above; metasoma tessellate, impunctate..... (41) *macrocephs*
 Antennae with 4th segment longer than 5th; head and thorax covered with dull white to slightly yellowish hairs, with or without admixture of black hairs..... 16
16. Head large, much broader than thorax; clypeus well convex and weakly tessellate to nearly smooth medially, shiny, distinctly punctate, covered with dull white hairs; vertex just behind ocellar region convex in front view; metasoma occasionally partly reddened (37) *dentata*
 Head large but narrower than in *dentata*; clypeus more densely tessellate, therefore less shiny, covered with primarily black hairs; vertex just behind ocellar region not convex in front view (38) *miyamotoi*
17. Antennae with 4th segment approximately as long as 5th; clypeus well convex, densely punctate, covered with rather long, dense, primarily blackish hairs; metasoma smooth, shiny, very finely punctate, partly reddened; length about 10 mm.(39) *sachalinensis*
 Antennae with 4th segment longer than 5th; head slightly broader than in *sachalinensis*; hairs on head and thorax shorter; metasoma slightly more distinctly punctate; length about 10 mm. (40) *pruniphora*
18. Mandibles long, slender, falciform, with a triangular projection at each base (*Andrena s. str.*) 19
 Mandibles not dentate basally 26
19. Fourth antennal segment as long as broad, much shorter than 5th; 3rd antennal segment a little more than twice as long as broad; clypeus short, transverse, only slightly exceeding line running bases of eyes, therefore head appears distinctly transverse; clypeus scarcely convex, broadly shiny and weakly punctate medially; length less than 8 mm.(12) *saragamineensis*
 Fourth antennal segment longer than broad 20
20. Third antennal segment about one and one-half times as long as broad, approximately as long as 4th segment which is slightly shorter than 5th; head subquadrate in front view; clypeus slightly convex medially, shiny, weakly and sparsely punctate; malar space one-fourth time as long as base of mandible; length less than 8 mm.(13) *benefica*
 Third antennal segment about or more than twice as long as broad, longer than 4th 21
21. Malar space short, about or less than one-fourth time as long as base of mandible..... 22
 Malar space longer, more than one-fourth time as long as base of mandible..... 24

22. Clypeus hardly convex, nearly flat, shiny and very sparsely punctate medially; ocelloccipital distance slightly longer than postocellar width; length about or less than 8 mm.(1) *brevih. tiscopa*
 Clypeus either longitudinally or transversely convex..... 22
23. Clypeus longitudinally convex, shiny, sparsely and weakly punctate, well exceeding line running bases of eyes; ocelloccipital distance approximately equal to postocellar width; thorax primarily with dull white hairs; length about or slightly over 8 mm.(7) *longiu bialis*
 Clypeus transversely convex medially, strongly and densely punctate with impunctate shiny spaces medially; clypeus not much exceeding line running bases of eyes; ocelloccipital distance shorter than postocellar width; thorax primarily with yellowish hairs; length about or less than 8 mm.(6) *cs. kii*
24. Large species, length over 10 mm.; malar space long, about one-half as long as base of mandible; clypeus strongly exceeding line running bases of eyes, distinctly narrowing toward apex..... (2) *mikado*
 Smaller, less than 10 mm.; malar space shorter 25
25. Hairs on body, especially those on thorax, primarily pale fulvous; clypeus hardly convex, weakly punctate, rather well exceeding line running bases of eyes(5) *nawai*
 Hairs on body primarily dull white mixed with black ones; head larger with facial quadrangle approximately as long as broad, primarily covered with blackish hairs; clypeus well convex subapically where smooth and sparsely punctate (11) *aburana*
26. Mandibles slender, curved, with sharp falciform apices; malar space evident, about one-third as long as base of mandible; antennae with 3rd segment slightly longer than broad, much shorter than elongate 4th segment (about 3 : 4.2); face covered with pale yellowish hairs; paraocular areas, frons and cheeks near eyes with black hairs; thorax with dull pale fulvous hairs; length about 9 mm. (4) (*Andrena*) *ishiharai*
 Mandibles normal; if falciform, then insects without combination of characters listed above..... 27
27. Enclosure of propodeum strongly and rather sparsely wrinkled, bounded by a transverse carina posteriorly (*Mitsukuriella*, *Plastandrena* and *Trachandrena*)..... 28
 Enclosure of propodeum not bounded by a transverse carina posteriorly 32
28. Apical margin of metasomal terga reflected (*Mitsukuriella*) 29
 Apical margin of metasomal terga normal 30
29. Hairs on thorax long, pale fulvous; wings subhyaline with darkened distal margins; apical reflections of metasomal terga weak; species flies from March to April.....(47) *fukaii*
 Hairs on thorax short, those on mesoscutum primarily brown to fuscous; wings strongly brownish; apical reflections of metasomal terga sharp; species flies from late May to June (46) *japonica*
30. Large species, length about 10 mm.; clypeus densely punctate with punctures small; lower paraocular areas with punctures obscure

- than those on clypeus; 3rd antennal segment longer than broad, shorter than 4th; propodeal enclosure with wrinkles irregular; metasoma shiny, weakly and sparsely punctate; hairs on body pale to pale fulvous except for brownish hairs on sides of face, frons and cheeks above near eyes (52) (*Plastandrena*) *astragalina*
- Smaller, length less than 9 mm.; punctures on lower paraocular areas distinct; enclosure of propodeum with wrinkles longitudinal (*Trachandrena*) 31
31. Smaller, length about 8 mm.; mandibles long, slender, falciform; clypeus very slightly convex, nearly rugoso-punctate; punctures on lower paraocular areas stronger than those on clypeus; cheeks broad; mesoscutum tessellate with large punctures (58) *foveopunctata*
- Mandibles not falciform, as usual; clypeus rather well convex, quite strongly rugoso-punctate with punctures as strong as or slightly stronger than those on lower paraocular areas; cheeks more or less receding; mesoscutum coarsely rugoso-punctate..... (59) *haemorrhoea japonibia*
32. Small species, length about or less than 7 mm.; enclosure of propodeum large for the size of insects, weakly and rather coarsely sculptured; 2nd intercubital vein ending close to pterostigma (*Micrandrena*) 33
- Larger, enclosure of propodeum finely sculptured; or if coarsely sculptured, then 2nd intercubital vein ending much apart from pterostigma..... 37
33. Metasomal terga shiny, nearly smooth or weakly tessellate, with an indication of very weak punctures; 4th antennal segment as long as broad, subequal to or indistinctly shorter than 3rd (42) *hikosana*
- Metasomal terga tessellate; if terga nearly smooth and shiny, then 4th antennal segment broader than long 34
34. Mesoscutum weakly tessellate, therefore rather shiny, with an indication of very weak, sparse punctures; clypeus sparsely covered with short dull white hairs, weakly tessellate, sparsely and weakly punctate..... (43) *brassicae*
- Mesoscutum and clypeus more tessellate, therefore dull or nearly so; clypeus densely covered with white long hairs 35
35. Mesoscutum tessellate with an indication of dense, roughened punctures; metasoma shiny, nearly smooth or weakly tessellate, with an indication of very weak punctures; clypeus with covering of hairs dense, obscure integument; posterior margins of intermediate sterna with dense hair fringes; 3rd antennal segment much longer than 4th (45) *komachi*
- Mesoscutum densely tessellate or nearly shagreened, with no trace of roughened punctures..... 36
36. Hairs on head and thorax greyish; mesoscutum strongly tessellate; posterior margins of intermediate sterna each with a sparse fringe of white glistening hairs; 3rd antennal segment as long as broad, indistinctly longer than 4th (44) *kaguya*
- Hairs on head and thorax white; mesoscutum weakly tessellate; hairs on sterna irregular in length, not arranged in a fringe;

- 3rd antennal segment a little broader than long, subequal to or indistinctly shorter than 4th..... (61) *sublevigata*
37. Process of labrum protuberant; clypeus transverse, nearly flat; antennae with 3rd segment much longer than broad, 4th at least as long as broad; cheeks well developed; mandibles slender, nearly falciform; length 7.5-9 mm. (*Cnemidandrena*)..... 38
 Process of labrum not protuberant..... 40
38. Posterior margins of cheeks not carinate; head and thorax with greyish white hairs; posterior margins of intermediate sterna each with a long fringe of glistening, well curled hairs; length about or less than 8 mm. (22) *mactai*
 Cheeks carinate behind; posterior margins of intermediate sterna without specially curled hair fringes (although with distinct hair fringes); larger, length about 9 mm. 39
39. Thorax above with pale fulvous hairs, not mixed with darker ones; 4th antennal segment slightly shorter than 5th..... (60) *albicaudata*
 Mesothorax with dull white hairs, mixed with blackish ones on the middle; 4th antennal segment as long as 5th..... (21) *seneciorum*
40. Cheeks well developed, carinate posteriorly; clypeus nearly flat, reflected at apex; process of labrum small; antennae with 3rd segment longer than broad, 4th broader than long; length less than 7 mm. (48) (*Notandrena*) *nitidiuscula*
 Cheeks normal..... 41
41. Third antennal segment slightly longer than 4th plus 5th which are broader than long respectively; hairs on head and thorax long, abundant, those on metasoma slightly shorter, dense, nearly uniform in colour, pale to yellowish; posterior margins of intermediate metasomal sterna with long, dense, golden hair fringes; length about or over 8 mm. (18) (*Chlorandrena*) *taraxaci chikuzenensis*
 Third antennal segment shorter than next two segments taken together 42
42. Ocelloccipital distance elongate, about or more than twice as long as postocellar width; usually rather large to large species (*Gymnandrena* and its allies) 43
 Ocelloccipital distance approximately as long as postocellar width; if slightly elongate, then metasomal terga tessellate 47
43. Clypeus broadly convex but not distinctly so medially, densely punctate; antennae with 3rd segment one and one-half times as long as broad, as long as 4th; malar space noticeable; hairs on body uniformly pale or pale fulvous on any one specimen; metasoma densely hairy; length about or over 10 mm. (32) *sasakii*
 Clypeus distinctly convex medially; metasomal terga less hairy (*Gymnandrena*) 44
44. Third antennal segment about twice as long as broad, slightly shorter than next two segments together; 4th antennal segment as long as broad; hairs on head and thorax short, dull white; malar space linear; large species, length about 12 mm. (28) *wulungshanensis*
 Third antennal segment approximately as long as next segment 45

45. Species from Amami-Oshima; clypeus considerably strongly convex medially; head and thorax primarily with pale fulvous hairs; metasoma smooth, shiny with fine and rather close punctures; length less than 9 mm. (31) *edashigei*
 Clypeus not exceedingly strongly convex; larger, length over 10 mm. 46
46. Metasoma without hair fringes; hairs on head and thorax primarily pale fulvous..... (29) *parathoracica*
 Metasoma with white hair fringes on posterior margins of intermediate terga; head and thorax with dull white and black hairs.....(27) *watasei*
47. Enclosure of propodeum rather strongly wrinkled; metasoma very shiny, feebly tessellate, with an indication of sparse fine punctures; posterior margins of 2nd to 4th terga with lateral fringes of sparse, white hairs; scutellum nearly smooth and shiny anteriorly; 3rd antennal segment much longer than 4th which is about as long as broad (40) *richardsi*
 Enclosure of propodeum less strongly wrinkled 48
48. Enclosure of propodeum large, subtriangular, densely, rather weakly wrinkled all over; 3rd antennal segment indistinctly longer than broad, indistinctly shorter than 4th; metasoma tessellate, nearly impunctate; length about 8 mm. (54) (*Simandrena*) *opacifovea*
 Enclosure of propodeum differently sculptured..... 49
49. Ocellocipital distance longer than ocellocular width; clypeus broadly flat, shiny, strongly punctate; 3rd antennal segment a little longer than broad, slightly shorter than 4th; metasomal terga tessellate, with distinct, close punctures (57) (*Taeniandrena*) *ezoensis*
 Ocellocular distance at most as long as postocellar distance; metasomal terga tessellate, impunctate (*Euandrena*) 50
50. Head primarily covered with black hairs; 3rd antennal segment one and one-half times as long as broad, a little longer than 4th which is a little shorter than 5th; hair fringes on intermediate terga inconspicuous; posterior margins of 3rd to 5th sterna each with a sparse fringe of white hairs not extending to the sides of each sternum and becoming shorter medially..... (23) *hebes*
 Head primarily covered with dull white hairs; tergal hair fringes slightly more conspicuous; posterior margins of 2nd to 5th sterna each with a dense fringe of glistening white, well arranged hairs..... (24) *stellaria*

Distribution of Japanese *Andrena*

So far as the literature is concerned, only a single species of *Andrena* has been known from Formosa (Taiwan)*. It is *Andrena formosana* Cockerell. From Okinawa, which is situated between Formosa and Japan, two species of *Andrena*, i.e., *Andrena okinawana* and *Andrena riukiensis* have been described, but the

* According to my recent study, I noticed that several species of *Andrena* have been taken from Formosa.

Table 1. *Distribution of Andrena occurring in Japan.*

Subgenus	Species	Hokkaido	Honshu	Shikoku	Kyushu	Tsushima	Yakushima	Amami-Oshima
Andrena	<i>brevihirtiscopa</i>	*	*		*			
	<i>mikado</i>		*	*	*		*	
	<i>bombiformis</i>		*		*			
	<i>ishiharai</i>	*	*	*				
	<i>nawai</i>	*	*					
	<i>esakii</i>			*	*			
	<i>longitibialis</i>		*	*	*			
	<i>maukensis</i>	*	*					
	<i>shirozui</i>	*	*					
	<i>hondoica</i>	*	*					
	<i>aburana</i>		*	*	*			
	<i>saragamineensis</i>			*				
	<i>benefica</i>	*	*		*			
	<i>prostomias</i>		*		*			
Calomelissa	<i>tsukubana</i>		*		*			
	<i>mitakensis</i>		*					
	<i>kamikochiana</i>	*	*					
Chlorandrena	<i>taraxaci chikuzenensis</i>				*			
Chysandrena	<i>knuthi</i>		*	*	*		*	
	<i>knuthi okinawana</i>							*
Cnemidandrena	<i>seneciorum</i>	*	*					
	<i>maetai</i>					*		
	<i>albicaudata</i>		*					
Euandrena	<i>hebes</i>		*	*	*			
	<i>stellaria</i>		*		*			
	<i>ruficrus rabicrus</i>	*	*					
	<i>takachihoi</i>	*	*		*			
Gymnandrena	<i>watasei</i>	*	*	*	*			
	<i>wulungshanensis</i>		*					
	<i>parathoracica</i>	*	*		*			
	<i>okabei sapporensis</i>	*						
	<i>edashigei</i>							*
?	<i>sasakii</i>		*	*	*			
Habromelissa	<i>omogensis</i>		*	*				
Holandrena	<i>valeriana</i>	*	*			*		
	<i>ishikawai</i>							*
	<i>taniguchiae</i>							*
Hoplandrena	<i>dentata</i>		*	*	*			
	<i>miyamotci</i>		*		*			
	<i>sachalinensis</i>	*						
	<i>pruniphora</i>	*	*		*			
	<i>macrocephs</i>	*						

Micrandrena	<i>hikosana</i>	*	*	*
	<i>brassicae</i>	*	*	*
	<i>kaguya</i>			*
	<i>komachi</i>		*	*
	<i>sublevigata</i>		*	*
	<i>falsificissima</i>		*	
Mitsukuriella	<i>japonica</i>		*	*
	<i>fukaii</i>		*	*
Notandrena	<i>nitidiuscula</i>	*	*	
?	<i>richardsi</i>		*	*
?	<i>amamiensis</i>			*
Parandrena	<i>yasumatsui</i>		*	
Plastandrena	<i>astragalina</i>	*		*
Poecilandrena	<i>fukuokensis</i>		*	*
Simandrena	<i>opacifovea</i>	*	*	*
	<i>kerriac</i>	*	*	*
Stenomelissa	<i>halictoides</i>		*	*
Taeniandrena	<i>ezoensis</i>	*	*	
Trachandrena	<i>foveopunctata</i>		*	*
	<i>haemorrhoea japonibia</i>	*	*	*

latter is not an *Andrena* but belongs to the genus *Colletes* (Hirashima, unpublished). I have examined some specimens of *Andrena ishikawai* taken from Okinawa which was originally described from the Amami-Oshima Island. Thus, so far as known, two species of *Andrena* are recorded from Okinawa at present.

I recorded five species of *Andrena* in all, in 1958 and 1960, including *Andrena okinawana*, from the Amami Islands. At least more than half of them, from the morphological point of view, are very interesting as shown in the systematic part of this paper.

So far as Kyushu is concerned, the Andrenid bee fauna, in the course of my study during the past ten years, has been more solely investigated than any other district of Japan. It becomes clear that thirty-five species of *Andrena* occur in the island of Kyushu. Out of them, nine species have been collected only from the mountainous regions such as Hikosan or Kuju. They are *Andrena brevihirtiscopa*, *mikado*, *bombiformis*, *esakii*, *longitibialis*, *takachihoi*, *miyamotoi*, *pruniphora*, and *halictoides*. Of these, *takachihoi* is known to be the sole *Andrena* which appears in autumn in Kyushu. Almost all the vernal species other than the species noted above, such as *Andrena aburana*, *benefica*, *knuthi*, *hebes*, *stellaria*, *fukaii*, *watasei*, *dentata*, *hikosana*, *brassicae*, *kaguya*, *komachi*, *sublevigata*, *astragalina*, *fukuokensis*, *opacifovea*, *kerriac*, *foveopunctata*, *haemorrhoea japonibia* and *sasakii*, are common or rather common, and primarily associate with flowers of *Brassica*.

The bee fauna of Tsushima has not yet solely been investigated. Only two species of *Andrena*, i.e., *maetai* and *valeriana*, are known there, but it seems probable that many more species may occur.

Only sixteen species of *Andrena* from Shikoku were recorded in this paper. It is desirable to investigate the distribution of *Andrena* in Shikoku more solely.

As can be seen from Table 1, Honshu is rich in number of the species than any other islands of Japan. Forty-eight species are recorded now.

It becomes clear at the present time that twenty-six species of *Andrena* are known from Hokkaido. Out of them, a dozen species are known to occur from Kyushu at the same time.

So far as the present study is concerned, the *Andrena* fauna of Japan, as a whole, is unexpectedly not rich. The number of species occurring in Japan is almost equal to that of British *Andrena* that have been listed by Richards (1937). The distribution of Japanese species, however, is interest in details. For example, the subgenera *Calomelissa*, *Mitsukuriella*, *Habromelissa* and *Stenomelissa* are known only from Japan. The last named subgenus is more or less related to the American *Conandrena*. The subgenus *Trachandrena* which seems to be essentially an American is represented by only five species in the Old World. Interestingly two species of them are found in Japan. As far as known, *Parandrena* occurs both in the New and Old Worlds, but the distribution of it in the latter is constricted to Japan alone. It is represented by a single species, *Andrena yasumatsui*, there.

It is well known that the present day territory of Japan belongs to the Manchurian Subregion in the Palaearctic Region. As can be seen from this fact, the *Andrena* fauna of Japan has a close relation to the continental ones. For example, *Andrena esakii* is a relative of *Andrena helvola*, *hondoica* of *praecox*, *parathoracica* of *nitida*, *valeriana* of *labialis*, *kaguya* of *subopaca*, *astragalina* of *tibialis*, *opacifovea* of *combinata*, *kerriac* of *dorsata*, and *ezoensis* of *ovatus*. Furthermore, *chikuzenensis* is a subspecies of *taraxaci*, *rabicrus* of *ruficrus*, *sapporensis* of *okabei*, and the continental *nitidiuscula* and *wulungshanensis* occur also in Japan. It seems probable to me that the more the *Andrena* fauna of the Manchurian Subregion is investigated, the more interesting relations between Japanese and Continental faunas may be found.

Subfamily Panurginae

The subfamily Panurginae is distinguished from the subfamily Andreninae primarily by the marginal cell, which is usually not longer than the distance from the apex of it to the wing tip, being usually obliquely truncate at the apex. The facial fovea, when present, is much smaller than in Andrenidae, not clothed with fine hairs, and frequently distinct in the males as well as in the females. The scopa of the females is primarily confined to the tibiae and basitarsi of the posterior legs.

Panurginae is divided into two tribes, Melitturgini and Panurgini. The tribe Melitturgini is represented by the single genus *Melitturga* which occurs in the Old World where it distributes from Europe to East Asia (Mongolia), but is not found in Japan. *Melitturga* is a small genus of robust bees. It is characterized by the presence of three submarginal cells in the fore wings, the absence of the facial fovea in the female, and especially by the male in which the compound eyes are strongly convergent above, the ocelli placed far down on the face near the antennal sockets and the antennae short and clavate.

The tribe Panurgini is represented by at least seventeen genera which are found in all the continents except Australia. It is distinguished from Melitturgini by the presence of the facial fovea in the females, the compound eyes not, or

only slightly, convergent above, and the ocelli placed near the summits of the head in the males. The tribe is represented only a single genus *Panurginus* in Japan.

Genus *Panurginus* Nylander

Panurginus Nylander, 1848, Notiser Sällskapet Fauna Flora Fennica, 1: 223.

Type-species: *Panurginus niger* Nylander, 1848. (Monobasic)

The genus *Panurginus* is holarctic in distribution. It is composed of slender bees having the two submarginal cells in the fore wings, and the males usually with the yellow clypeus. The facial fovea is present in the males as well as the females. The gonostyli on the gonocoxite of the male genitalia are present.

Since the genus is represented by only a single species in Japan and sufficient material of the foreign species is not now available to me, no attempt will be made to describe the genus in this paper.

(1) *Panurginus crawfordi* Cockerell

Panurginus crawfordi Cockerell, 1914, Ann. Mag. nat. Hist., (8) 13: 279, male; Yasumatsu, 1938, Ins. Jap. Illust. Icon. Col. ad Nat. Depicta: 378, pl. 168, fig. 657, 2; Yasumatsu, 1950, Icon. Ins. Jap. 2nd ed.: 1483, fig. 4281, female and male.

This species is the only representative of the genus *Panurginus* in Japan. According to Cockerell, this species is a close relative of *Panurginus herzi* Morawitz from Siberia. It occurs primarily in western half of Japan and has not been found in Hokkaido. It is one of the commonest bees which fly in spring there. It has a generation in a year. The biology of this species was observed by me in 1958-1960, and the result was presented in Part I (1962) of this paper.

Female: Length about or less than 8 mm.

Colour: Black without yellow maculations; mandibles reddened apically; flagellum beneath obscurely brownish to reddish brown; wings slightly brownish subhyaline, with distal margins scarcely darkened; veins and stigma brownish; tegulae deep brown; legs black or piceous, small segments of tarsi brownish, or sometimes tibiae and tarsi, especially hind ones, brownish; metasoma occasionally piceous basally, posterior margins of metasomal terga hardly discoloured or only slightly brownish in fresh specimens.

Pubescence: Hairs on head short, sparse, rather fine, whitish or only slightly yellowish; hairs on thorax rather short to more or less long, sparse but slightly dense on anterior portion of mesoscutum and on mesopleuron, slightly yellowish, not mixed with brownish ones; propodeum bare medially, with whitish hairs laterally; metasoma scanty of hairs, with 1st tergum bare on disc; posterior margins of metasomal terga without hair bands; sparse cilia on metasomal terga as well as rather dense caudal fimbria yellowish; hairs on metasomal sterna yellowish; hairs on legs primarily yellowish; tibial scopa scanty, composed of rather coarse, simple, yellowish hairs.

Structure: Head slightly narrower than thorax seen from above, subquadrate in front view; mandibles moderate; labrum smooth and shiny basally, with a

triangular projection apically; malar space linear anteriorly, slightly widened posteriorly; clypeus longitudinally well convex, only slightly exceeding below line running bases of eyes, smooth, shiny, scattered with weak punctures; supraclypeal area also well convex, smooth, shiny, weakly and sparsely punctate; lower paraocular areas shiny, weakly punctate with punctures slightly denser than clypeus; facial fovea well indicated, separated from eye by a wide space; frons and upper paraocular areas tessellate and weakly punctate, nearly dull or much less shiny than lower paraocular areas; scape long, shiny and weakly punctate in front; flagellum not elongate, with 3rd antennal segment longer than broad, slightly longer than 4th; postocelli rather close each other, distance between them slightly longer than ocelloccipital distance, about one-half as long as ocellocular distance; cheeks broader than eyes, roundly convex, especially so just behind summits of eyes, very smooth and shiny, scattered with weak punctures.

Mesoscutum narrowly tessellate-punctate anteriorly, broadly smooth and shiny posteriorly with weak and sparse punctures; scutellum nearly flat or only slightly convex, smooth, shiny, very weakly and rather densely punctate; propodeum densely tessellate, impunctate, nearly dull or weakly shiny; mesopleuron tessellate, with sparse and weak punctures. Wings as illustrated (Pert 2, Systematics, 1). Legs rather robust, without special modification.

Metasoma broad and rather thin; 1st tergum smooth, shiny, scattered with microscopical fine punctures, with posterior depressions narrow, weakly indicated, very finely tessellate; 2nd and following terga finely tessellate, impunctate or scattered with microscopical fine punctures, with posterior depressions slightly widened medially, more or less well indicated.

Male: Length 6–7 mm., occasionally slightly more larger.

Colour: Black, clypeus pale yellow; mandibles reddened apically; flagellum only indistinctly brownish beneath in fresh specimens; legs nearly black or piceous with fore and mid tarsi brownish to pale, fore tibiae pale or slightly yellowish anteriorly; hind tarsi, especially small segments, brownish; wings and tegulae as in female; metasoma nearly piceous or sometimes brownish basally, with posterior margins of terga brownish.

Pubescence: Hairs on head and thorax more or less long, sparse, whitish to slightly yellowish, not mixed with brownish ones; metasoma scanty of hairs; hairs on metasomal terga yellowish; hairs on legs primarily yellowish.

Structure: Head slightly narrower than thorax seen from above, subquadrate in front view, with inner eye margins slightly convergent below; mandibles moderately long, rather robust; labrum with an apical projection; malar space obsolescent; clypeus almost protuberant but slightly exceeding below beyond line running bases of eyes, shiny, distinctly punctate; supraclypeal area shiny, weakly punctate; frons and vertex just behind ocellar region densely tessellate or occasionally the former slightly shagreened; antennae slightly elongate, with 3rd segment as long as or a little longer than broad, slightly longer than 4th which is indistinctly broader than long; postocelli close each other, distance between them as long as or slightly longer than ocelloccipital distance, about one-half time as long as ocellocular distance; cheeks roundly convex, shaped as in female, slightly more densely and distinctly punctate than in female.

Sculpture of thorax very close to female with horizontal area of propodeum occasionally slightly more coarsely sculptured. Wings as in female. Legs with

fore and mid pairs slender; hind tibiae slightly swollen subapically; hind basitarsi robust, small segments of hind tarsi much more robust than corresponding segments of mid and fore pairs with distitarsi dilated.

Metasoma very finely tessellate or partly nearly smooth, impunctate or scattered with microscopical fine punctures; posterior depressions of metasomal terga well indicated.

Distribution: Japan (western Honshu, Shikoku and Kyushu).

Specimens examined: A series of specimens were examined from Honshu, Shikoku and Kyushu which were collected by Y. Maeta, T. Kobayashi, K. Nohara, K. Yasumatsu and Y. Hirashima.

Flower records: This species primarily associates with the flowers of *Brassica* spp. and *Potentilla* spp. Miyamoto (1960) recorded *Taraxacarpus*, *Platycarpus*, *Astragalus sinicus*, *Potentilla fragarioides*, *Amelanchier asiatica*, and *Brassica campestris*. I was able to collect this species further on the flowers of *Malus pumila* var. *dulcissima* Koidz.

Literature*

Alfken, J. D.

1900 Drei neue *Anthrena* Arten aus Japan. Ent. Nachr., 26: 176-180.

1924 *Andrena japonica* Alfken, ♂. Konowia, 3: 95-96.

1932 Beiträge zur Kenntnis paläarktischen Bienen. Mitt. Deut. ent. Ges., 3: 117-120.

Ashmead, W. H.

1899 Classification of the bees, or the superfamily Apoidea. Trans. Amer. ent. Soc., 26: 49-100.

Bishoff, H.

1927 Biologie der Hymenopteren. Berlin. 598 pp.

Cockerell, T. D. A.

1897 On the generic position of some bees hitherto referred to *Panurgus* and *Calliopsis*. Canad. Ent., 29: 287-290.

1911 Bees in the collection of the United States National Museum. 2. Proc. U. S. nat. Mus., 40: 241-264.

1911 Descriptions and records of bees.—XXXIV. Ann. Mag. nat. Hist., (8) 7: 225-236.

1913 Descriptions and records of bees.—XLIX. Ann. Mag. nat. Hist., (8) 11: 185-195.

1914 Descriptions and records of bees.—LVII. Ann. Mag. nat. Hist., (8) 13: 277-286.

1917 Some Japanese bees. Entomologist, 50: 85-86.

1922 Bees in the collection of the United States National Museum.—4. Proc. U. S. nat. Mus., 60: 1-20.

1929 Some bees of the group *Trachandrena* Robertson. Ann. Ent. Soc. Amer., 22: 754-758.

* The literature published until 1960 is listed here. Those pertaining to the present work published after that date will be listed elsewhere.

- 1930 Descriptions and records of bees.—CXXI. Ann. Mag. nat. Hist., (10) 5: 108-115.
- 1936 Bees from northern California. Pan-Pacific Ent., 12: 133-164.
- Dalla Torre, C. G. de
1896 Catalogus Hymenopterorum, vol. 10, Apidae (Anthophila). 643 pp.
- Emeis, W.
1955 Auffällig gehäuftes Auftreten der Erdbiene *Andrena thoracica* F. in Dünengebiet der Nordseeinsel Amrum (Hym. Apid.). Bonn. zool. Beitr., 6: 212-219.
- Erlandsson, Stellan
1958 Notes on *Panurginus romani* Auriv. (Hym.). Ent. Tidschr., 79: 43-46.
- Friese, H.
1922-23 Die europäischen Bienen (Apidae). Das Leben und Wirken unserer Blumenwespen. Berlin und Leipzig. 456 pp.
- Hedicke, H.
1930 Hymenoptera, in Die Tierwelt Mitteleuropas. V. Band. 246 pp.
1933 Beiträge zur Systematik der Gattung *Andrena* F. (Hym. Apid.). Mitt. zool. Mus. Berlin, 19: 199-220.
- Hirashima, Y.
1952 Descriptions and records of bees of the genus *Andrena* from Eastern Asia. I. (Hymenoptera, Andrenidae). Mushi, 23: 37-43.
1952 Descriptions and records of bees of the genus *Andrena* from Eastern Asia. II. (Hymenoptera, Andrenidae). Mushi, 24: 29-33.
1952 Description of *Andrena yasumatsui* n. sp., with a provisional key to the subgenera of Palearctic *Andrena* (Hymenoptera, Andrenidae). Mushi, 24: 59-65.
1953 The Insect Fauna of Mt. Ishizuchi and Omogo Valley, Iyo, Japan. Four new species of Apoidea (Hymenoptera). Trans. Shikoku ent. Soc. 3: 132-138.
1957 Descriptions and records of bees of the genus *Andrena* from Eastern Asia. III (Hymenoptera, Andrenidae). Mushi, 30: 49-57.
1957 Descriptions and records of bees of the genus *Andrena* from Eastern Asia. IV (Hymenoptera, Andrenidae). Mushi, 30: 59-66.
1958 Bees of the Amami Islands. I (Hymenoptera, Apoidea). Mushi, 32: 69-76.
1960 Bees of the Amami Islands. II (Hymenoptera, Apoidea). Mushi, 33: 53-62.
- Hodges, Dorothy
1952 The pollen loads of the honeybee. A guide to their identification by colour and form. London. 51 pp.
- Iwata, K.
1955 The comparative anatomy of the ovary in Hymenoptera. Part I. Aculeata. Mushi, 29: 17-34.
1960 The comparative anatomy of the ovary in Hymenoptera. Supplement on Aculeata with descriptions of ovarian eggs of certain species. Acta Hym., 1: 205-211.
- Kawamura, M.
1957 On the nest of *Andrena prostomias* Pérez. Gensei, 5: 19-20.

- Lanham, U. N.
 1949 A subgeneric classification of the New World bee of the genus *Andrena*. Univ. Calif. Pub. Ent., 8: 183-237.
- Linsley, E. G.
 1937 The occurrence of double broods in North American andrenid bees. Bull. Brooklyn Ent. Soc., 32: 125-127.
 1958 The ecology of solitary bees. Hilgardia, 27: 543-599.
- Linsley, E. G. and J. W. MacSwain
 1956 Further notes on the taxonomy and biology of the Andrenine bees associated with *Oenothera* (Hymenoptera: Andrenidae). Pan-Pacif. Ent., 32: 111-121.
 1959 Ethology of some Ranunculus insects with emphasis on competition for pollen. Univ. Calif. Pub. Ent., 16: 1-45.
- Linsley, E. G., J. W. MacSwain and Ray F. Smith
 1952 Outline for ecological life histories of solitary and semi-social bees Ecology, 33: 558-567.
- MacSwain, J. W.
 1954 Nesting habits of *Andrena rhodotricha* Linsley. Pan-Pacif. Ent., 21: 134.
- Malyshev, S.
 1926 The nesting habits of *Andrena* F. Trav. Soc. Nat. Leningrad, 56: 25-78. (Not seen)
 1936 The nesting habits of solitary bees. A comparative study. Eos, 11: 201-309.
- Matsumura, S.
 1911 Erster Beitrag zur Insekten-Fauna von Sachalin. Journ. Coll. Agr., Tohoku Imp. Univ., 4: 107.
 1912 Thousand Insects of Japan, Supplement IV. 247 pp.
 1930 Illustrated Thousand Insects of Japan, vol. II (Hymenoptera). 198 plus 89 pp.
 1931 6000 Illustrated Insects of Japan-Empire. 1497 plus 191 pp.
 1932 Illustrated Common Insects of Japan, vol. IV (Hymenoptera, Diptera, Rhynchota). 99 plus 145 pp.
- Matsumura, S. und T. Uchida
 1926 Die Hymenopteren-Fauna von den Riukiu-Inseln. Ins. Mats., 1: 63-77.
- Meade-Waldo, G.
 1916 Notes on Apidae (Hymenoptera) in the collection of the British Museum, with descriptions of new species. Ann. Mag. nat. Hist., (8) 17: 448-470.
- Michener, C. D.
 1944 Comparative external morphology, phylogeny, and a classification of the bees (Hymenoptera). Bull. Amer. Mus. nat. Hist., 82: 151-326.
 1953 Life-History Studies in Insect Systematics. Syst. Zool., 2: 112-118.
- Michener, C. D. and C. W. Rettenmeyer
 1956 The ethology of *Andrena erythronii* with comparative data on other species (Hymenoptera, Andrenidae). Univ. Kansas Sci. Bull., 37: 645-684.
- Michener, C. D. et al.
 1958 Factors influencing the distribution of bee's nests in earth banks. Ecology, 39: 207-217.
- Miyamoto, S.
 1960 Flower visiting habits of fourteen species of Andrenid bees (Biological studies on Japanese bees XIV). Kontyû, 28: 65-86.

- Morice, F. D.
 1899 Illustrations of specific characters in the armature and ultimate ventral segments of *Andrena* ♂. Trans. Ent. Soc. London, 1899: 229-252.
- Musebeck, C. F. W., et al.
 1951 Hymenoptera of America north of Mexico. Synoptic Catalog. U. S. Dept. Agr., Agr. Monog. 2. 1420 pp.
- Nielsen, E. T.
 1934. Sur les habitudes des Hyménoptères aculéates solitaires. IV. (Apidae). Ent. Medd., 8: 421-472.
- Niemelä, P.
 1949 Mitteilungen über die Apiden (Hym.) Finnlands. 3. Die Untergattung *Taeniandrena* Hedicke. Ann. ent. Fenn., 15: 101-120.
- Okabe, K.
 1939 Einige in der Nordmandschurei gefangene Hymenopteren (Vespoidea und Apoidea). Trans. Kansai ent. Soc., (8): 22.
- Pérez, J.
 1905 Hyménoptères recueillis dans le Japon central, par M. Harmand, ministre plénipotentiaire de France à Tokio. Bull. Mus. d'Hist. Naturelle, Paris, 1905: 33-35.
- Perkins, R. C. L.
 1919 The British species of *Andrena* and *Nomada*. Trans. Ent. Soc. London, 1919: 218-320.
- Pittioni, B.
 1948 *Andrena* (*Andrenella*) *enslinella* Stckht. und ihre Verwandten (Hym. Apid.). Ann. naturh. Mus. Wien, 56: 130-149.
 1949 Beiträge zur Kenntnis italienischer Bienen (Hymenoptera, Apoidea). Boll. Ist. Ent. Bologna, 17: 46-61.
- Pittioni, B. und R. Schmidt
 1943 Die Bienen des südöstlichen Niederdonau. II. Andrenidae und isoliert stehende Gattungen. Niederdonau, Natur und Kultur, 24. Heft. 89 pp.
- Pittioni, B. und E. Stöckert
 1950 Ueber einige neue und verkannte *Andrena*-Arten (Hymenoptera, Andrenidae). Beiträge zur Kenntnis der paläarktischer Apiden. III. Ann. naturh. Mus. Wien, 57: 284-295.
- Popov, V. B.
 1949 Subgenus *Plastandrena* Hedicke and its new representatives (Hymenoptera, Apoidea). Ent. Obozr., 30: 389-404.
 1958 On three subgenera of the genus *Andrena* (Hymenoptera, Andrenidae) Horae Soc. ent. Univ. Sovet., 46: 109-161.
- Robertson, C.
 1902 Synopsis of Andrenidae. Trans. Amer. ent. Soc., 28: 187-194.
- Sandhouse, G. A.
 1943 The type species of the genera and subgenera of bees. Proc. U. S. nat. Mus., 92: 519-619.
- Schmiedeknecht, O.
 1930 Die Hymenopteren nord- und mitteleuropas. Zweite Auflage. 1062 pp.
- Smith, F.
 1873 Descriptions of Aculeate Hymenoptera of Japan, collected by Mr. George Lewis at Nagasaki and Hiogo. Trans. Ent. Soc. London, 1873: 181-206.

- 1879 Descriptions of new species of Hymenoptera in the collection of the British Museum. London.
- Stöckhert, F. K.
 1933 Die Bienen Frankens (Hym. Apid.). Deut. ent. Zeit., 1932, Beiheft.
 1954 Fauna Apoideorum Germaniae. Abh. Bayerischen Akad. Wissensch., Neue Folge, Heft 65. 87 pp.
- Strand, E. and K. Yasumatsu
 1938 A new *Andrena*-species from Japan (Hymenoptera: Apoidea). Mushi, 11: 67-69.
- Šustera, Oldřich
 1958 Uebersicht des Systems der paläarktischen und mitteleuropäischen Gattungen der Superfamilie Apoidea (Hymenoptera). Acta Ent. Mus. Nat. Pragae, 32: 443-463.
- Takeuchi, K.
 1955 Coloured Illustrations of the Insects of Japan. 190 pp.
- Taniguchi, S.
 1951 Biological studies on the Japanese bees, 1. Comparative study of glossa. Sci. Rep. Hyogo Univ. Agr., Ser. Agr. Biol., 1: 81-89.
- Tosawa, N.
 1932 List of Insects of Minoo Park, Osaka, Japan. 114 pp.
- Uéda, S.
 1954 A list of the known *Andrena*-species from Shikoku (Hymenopterous Notes II.). Trans. Shikoku ent. Soc., 4: 50.
- Vecht, J. van der
 1928 Fauna van Nederland. Afl. IV. Hymenoptera Anthophila *Andrena*. 144 pp.
- Viereck, Henry L.
 1919 Notes on the bee genus *Andrena* (Hymenoptera). Proc. biol. Soc. Washington, 31: 59-60.
 1922 New bees of the genus *Andrena*. Occ. Papers Boston Soc. nat. Hist., 5: 35-45.
- Yano, M.
 1932 Hymenoptera, in Iconographia Insectorum Japonicorum. Tokyo.
- Yasumatsu, K.
 1930 Three new or unrecorded Apoidea from Saghalien (Hymenoptera). Ins. Mats., 13: 66-70.
 1935 Reports of the First Scientific Expedition to Manchoukuo. Insects of Jehol, fasc. 8, Apoidea.
 1938 On the occurrence of *Andrena vitiosa* Smith in Japan. Zool. Mag., Tokyo: 50: 358-361.
 1939 Three new or unrecorded Apoidea from Saghalien (Hymenoptera). Ins. Mats., 8: 66-70.
 1939 Hymenoptera, in Insectorum Japonicorum Illustratio Iconographia coloribus ad naturam Depicta.
 1941 A list of the Far Eastern species of the genus *Andrena* (Hym. Apoidea). Peking nat. Hist. Bull., 15: 273-284.
 1947 Some wasps and bees of the desert Kunshan-Tagh in Inner Mongolia. Mushi, 18: 29-33.
 1950 Hymenoptera, in Iconographia Insectorum Japonicorum, 2nd ed.

INDEX TO THE SPECIFIC NAMES OF ANDRENIDAE OF JAPAN

(Synonyms and homonyms are in italics)

- aburana Hirashima (*Andrena*), (11)
albicaudata Hirashima (*Cnemidandrena*), (60)
alopex Cockerell, see *sasaki* Cockerell
amamiensis Hirashima, (50)
anthracina auct. nec Morawitz, see *japonica* (Smith)
astragalina Hirashima (*Plastandrena*), (52)
azalearum Cockerell, see *watasei* Cockerell
benefica Hirashima (*Andrena*), (13)
biscutata Pérez, see *dentata* Smith
bombiformis Yasumatsu et Hirashima (*Andrena*), (3)
brassicae Hirashima (*Micrandrena*), (43)
brevihirtiscopa Hirashima (*Andrena*), (1)
consimilis Alfken (Undetermined species)
crawfordi Cockerell (*Panurginus*)
dentata Smith (*Hoplandrena*), (37)
edashigei Hirashima (*Gymnandrena*), (31)
esakii Hirashima (*Andrena*), (6)
ezoensis Hirashima (*Taeniandrena*), (57)
falsificissima Hirashima (*Micrandrena*), (62)
florea sachalinensis Yasumatsu, see *sachalinensis* Yasumatsu
foveopunctata Alfken (*Trachandrena*), (58)
fukaii Cockerell (*Mitsukuriella*), (47)
fukuokensis Hirashima (*Poecilandrena*), (53)
haemorrhoea japonibia Hirashima (*Trachandrena*), (59)
halictoides Smith (*Stenomelissa*), (56)
hebes Pérez (*Euandrena*), (23)
hikosana Hirashima (*Micrandrena*), (42)
hondoica Hirashima (*Andrena*), (10)
ishiharai Hirashima (*Andrena*), (4)
ishikawai Hirashima (*Holandrena*), (35)
japonica Alfken, see *nawai* Cockerell
japonica (Smith) (*Mitsukuriella*), (46)
kaguya Hirashima (*Micrandrena*), (44)
kamikochiana Hirashima (*Calomelissa*), (17)
kerriae Hirashima (*Simandrena*), (55)
knuthi Alfken (*Chrysandrena*), (19)
knuthi okinawana Matsumura et Uchida (*Chrysandrena*), (20)
komachi Hirashima (*Micrandrena*), (45)
longitibialis Hirashima (*Andrena*), (7)
macrocephala Matsumura (*Hoplandrena*), (41)
maetai Hirashima (*Cnemidandrena*), (22)
maukensis Matsumura (*Andrena*), (8)
mikado Strand et Yasumatsu (*Andrena*), (2)
mitakensis Hirashima (*Calomelissa*), (16)
mitsukurii Cockerell, see *japonica* (Smith)
miyamotoi Hirashima (*Hoplandrena*), (38)
nawai Cockerell (*Andrena*), (5)
nipponica Cockerell, see *nawai* Cockerell
nitidiuscula Schenck (*Notandrena*), (48)
okabei sapporensis Hirashima (*Gymnandrena*), (30)
okinawana Matsumura et Uchida, see *knuthi okinawana* Matsumura et Uchida
omogensis Hirashima (*Habromelissa*), (33)
opacifovea Hirashima (*Simandrena*), (54)
parathoracica Hirashima (*Gymnandrena*), (29)
praecociformis Cockerell (Undetermined species)
prostomias Pérez (*Calomelissa*), (14)
pruniphora Hirashima (*Hoplandrena*), (40)
richardsi Hirashima, (49)
(riukiensis (Matsumura) (Colletes))
ruficrus rabicrus Hirashima (*Euandrena*), (25)
sachalinensis Yasumatsu (*Hoplandrena*), (39)
saragamineensis Hirashima (*Andrena*), (12)

- sasakii Cockerell (?*Gymnandrena*), (32)
 seneciorum Hirashima (*Cnemidandrena*),
 (21)
 shirozui Hirashima (*Andrena*), (9)
 simulans Pérez, see nawai Cockerell
 simulatilis Viereck, see nawai Cockerell
 stellaria Hirashima (*Euandrena*), (24)
 sublevigata Hirashima (*Micrandrena*),
 (61)
 subopaca auct. nec Nylander, see bras-
 sicae Hirashima
 takachihoi Hirashima (*Euandrena*), (26)
 taniguchiae Hirashima (*Holandrena*),
 (36)
 taraxaci chikuzenensis Hirashima
 (*Chlorandrena*), (18)
 tsukubana Hirashima (*Calomelissa*), (15)
 valeriana Hirashima (*Holandrena*), (34)
 vitiosa Yasumatsu nec Smith, see hal-
 ictoides Smith
 watasei Cockerell (*Gymnandrena*), (27)
 wulungshanensis Yasumatsu (*Gymnand-
 rena*), (28)
 yasumatsui Hirashima (*Parandrena*), (51)