

Systematic and biological studies of the family Andrenidae of Japan (Hymenoptera, Apoidea) Part 2. Systematics, 5

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

Part 2. Systematics, 5*

Yoshihiro HIRASHIMA

11. Subgenus *Micrandrena* Ashmead

Micrandrena Ashmead, 1899, Trans. Amer. ent. Soc., 26: 89; Lanham, 1949, Univ.

Calif. Pub. Ent., 8 : 208; Hirashima, 1952, Mushi, 24 : 63.

Andrenella Hedicke, 1933, Mitt. Zool. Mus. Berlin, 19: 210.

Type-species: *Micrandrena pacifica* Ashmead, 1899.

Diagnosis: The genus is composed of the tiny species which have the integument being usually tessellate. This is best characterized in having the vein second transverse cubitus ending close to the pterostigma. The enclosure of the propodeum is rather large for the size of insect and is usually coarsely sculptured. The metasoma is distinctly tessellate or unusually polished as in *Andrena hikosana* Hirashima, usually impunctate or occasionally punctate in the Old World species.

The subgenus distributes in both the New and Old Worlds. Since the description of the subgenus has been presented by Hedicke and Lanham respectively, a brief description of it is given below.

Description: Small species, integument black in our species. Head moderate in size ; process of labrum flat, entire; malar space obsolescent; thorax with none of pubescence black, propodeum usually coarsely sculptured ; enclosure of propodeum large, usually more coarsely sculptured than dorsal face of propodeum; fore wings with three submarginal cells; vein 2nd transverse cubitus close to pterostigma ; metasoma densely tessellate, rarely polished, impunctate or occasionally with an indication of microscopical fine punctures.

Female: Facial fovea separated from eye by a shiny space; antennae with 3rd segment about equal to or slightly shorter than 4th plus 5th; propodeal corbicular rather poorly developed, with dorsal fringe of more or less long, scanty hairs; interior of corbicular with sparse, coarse, simple hairs; trochanteral floccus imperfect, scanty in our species; tibial scopa moderately compact, outer face composed of rather fine, simple hairs; mid basitarsi slender, narrower than hind basitarsi ; posterior spur of hind tibia normal; posterior margins of 2nd and 3rd metasomal terga with or rarely without lateral hair fringes.

Male: Clypeus black; antennae with 3rd segment at least as long as broad,

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as long as or longer than 4th; mandibles not specially modified ; cheeks narrower than eyes, receding; genitalia small, with parapenial lobe only slightly produced; paramere slender, neither elongate nor expanded apically; sagitta slightly widened basally, sides not excavated.

(42) *Andrena (Micrandrena) hikosana* Hirashima

Andrena (Micrandrena) hikosana Hirashima, 1957, Mushi, 30 (9): 53, female.

This species is readily recognized by the integuments of the mesoscutum, scutellum, mesopleuron and metasoma are very shiny, and especially the latter is almost polished. The posterior margins of the metasomal terga are thick and not at all fading in colour, and the posterior depression of the terga hardly indicated in the middle. The facial fovea of the female is separated from the eye margin by a wide shiny space. Thus, this species easily distinguishable from members of this subgenus.

This species was originally described from Mt. Hikosan, Kyushu. Since the description of it in 1957, I was able to collect a short series of female specimens at Sapporo, Hokkaido and Tenryukyo, Nagano Pref. It is known at the present time from Kyushu, Honshu and Hokkaido, suggesting that it may be found in Shikoku.

Female: Length about 7 mm.

Colour: Black; mandibles reddened apically; flagellum beneath brownish or reddish brown; wings slightly brownish subhyaline, veins and stigma brown; tegulae pale brownish to brownish subhyaline posteriorly, blackened anteriorly and narrowly so interiorly, legs with basitarsi, especially hind ones, frequently obscurely reddish brown; small segments of tarsi brownish; tibial spurs pale; posterior margins of metasomal terga black, very narrowly reddish brown in some light.

Pubescence: Hairs on body short, scanty, nearly uniformly greyish or very slightly yellowish grey in colour; facial fovea silvery, bright and very slightly yellowish in some light; hairs on mesoscutum sparse, erect; dorsal fringe of propodeal corbicula sparse, not well arranged; interior of corbicula with sparse, rather coarse, simple hairs; trochanteral floccus imperfect, sparse; femoral floccus somewhat dense, composed of bright simple hairs; tibial scopa not specially dense, rather well arranged, composed of silvery white, rather short, simple hairs; metasoma scanty of hairs, only slightly hairy laterally, without tergal hair fringes; caudal fimbria bright, yellowish, not dense.

Structure: Head of moderate size about as broad as thorax seen from above, transverse in front view; mandibles moderately long, rather robust; malar space linear, slightly widened posteriorly; process of labrum large, nearly quadrate, apex entire; clypeus well convex, densely tessellate or weakly shagreened, with weak, sparse, somewhat roughened punctures; clypeus slightly exceeding line running bases of eyes, its index about 1.5:0.7; facial quadrangle longer than broad (about 6.2:5); antennae rather long, 3rd segment as long as 4th plus 5th; 4th segment slightly broader than long; 5th segment approximately as long as broad; facial fovea narrow, upper end not clearly indicated, separated from eye margin by a wide shiny space; ratio of postocellar width to ocellocipital distance to postocellar distance to ocellular distance about 1.2:1.2:2.7:3.6; cheeks

about as broad as eyes seen in profile, rugulose with an indication of microscopical punctures, shiny; in holotype and some other specimens, posterior angles of cheeks convex outwardly so that cheeks appear concaved medially seen from above. Wings with stigma large; 2nd submarginal cell receiving 1st recurrent vein about middle of cell; basal vein interstitial with nervulus or nearly so. Legs with mid basitarsi scarcely dilated medially, a little narrower than hind basitarsi; posterior spurs of hind tibiae very slightly curved. Metasomal terga specially shiny; 1st tergum nearly smooth; about basal half of 2nd tergum weakly, those of 3rd and 4th more weakly tessellate; metasomal terga nearly impunctate or scattered with microscopical fine punctures; posterior of margins of terga thick and posterior depressions hardly indicated medially.

Male (New to science): Length slightly over 6 mm.

Colour: Black; mandibles reddened apically; flagellum obscurely reddish brown beneath; wings a little more paler than in female; veins and stigma brown; tegulae pale brownish subhyaline posteriorly, blackened anteriorly and narrowly so interiorly; legs black, with small segments of tarsi and apices of basitarsi brownish; posterior margins of metasomal terga obscurely piceous in some light or nearly black.

Pubescence: Hairs on clypeus long, rather dense, downy, snow-white; hairs on the rest of head and thorax more or less long to long, more or less dense, pale above and whitish to white below, those on metasomal terga rather short to short, sparse, pale, not mixed with brownish hairs on any portion; hairs on posterior margins of 2nd to 4th terga more dense laterally than elsewhere.

Structure: Head of moderate size, a little broader than thorax seen from above, transverse in front view; mandibles rather short, slender; malar space linear; process of labrum broader than long, but not so transverse, slightly convex and weakly emarginate apically; clypeus well convex, shagreened with weak, somewhat dense, more or less roughened punctures, dull; clypeus slightly exceeding line running bases of eyes, its index 1.3 : 0.7; facial quadrangle longer than broad (5.5 : 4.3); antennae elongate with 3rd segment a little longer than broad and a little longer than 4th; 4th segment approximately as long as broad and shorter than 5th; 5th and following segments slightly convex beneath; frons obscurely longitudinally striate with an indication of roughened punctures; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.1 : 1.2 : 2.6 : 3.7; vertex rugulose, shiny; cheeks narrower than large eyes, rugulose, distinctly receding beneath. Mesoscutum densely tessellate or nearly shagreened, feebly shiny, with an indication of sparse, weak, somewhat roughened punctures; scutellum nearly as in mesoscutum; propodeum coarsely sculptured with irregular rugae; enclosure poorly defined, large, almost as strongly wrinkled as dorsal face of propodeum; mesopleuron nearly shagreened with roughened punctures which are more roughened than those on mesoscutum. Wings as in female. Legs slender, as usual. Metasomal terga very shiny, smooth except for bases of 2nd to 4th terga where microscopically tessellate, scattered with microscopical fine punctures; posterior margins of basal four terga rather thick, those of 5th and 6th terga thin; posterior depressions of 1st to 4th terga hardly indicated medially, those of 5th and 6th very weakly indicated. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Hokkaido, Honshu and Kyushu).

Specimens examined: from Hokkaido : 2 females on flowers of *Cimicifuga*

simplex Wormskjold var. *ramosa* Maximowicz and 3 females on *Dasyphora fruticosa* Rydberg, Botanical garden at Sapporo, 27. vi. 1958 (Y. Hirashima): from *Honshu*: 9 females, on the flowers of *Euonymus alata* Sieb. var. *subtriflorus* Franch. et. Sav., Tenryukyo, Nagano Pref., 8. v. 1961 (Y. Hirashima): from *Kyushu*: 1 female, Wakasugiyama, Prov. Chikuzen, 10. iv. 1931 (Hori, Fujino and Cho); 1 male, same locality as above, 17. iv. 1932 (K. Yasumatsu); 1 allotype male, Mt. Hikosan, Prov. Buzen, 900 m., 26. iv. 1938 (K. Yasumatsu); 1 female, same locality as above, 12. v. 1952 (Y. Hirashima); 1 female, Odomari-Satamisaki, Sata, Prov. Osumi, 29. v. 1953 (Esaki and Hirashima); 3 females and 9 males, on *Prunus americana*, Campus, Shinshu Univ., Ina City, 19-20. iv. 1961 (Y. Maeta).

Flower records: Females have been collected on *Brassica campestris* Linnaeus, *Cimicifuga simplex* Wormskjold var. *ramosa* Maximowicz, *Dasyphora fruticosa* Rydberg and *Euonymus alata* Sieb. var. *subtriflorus* Franch. et. Sav. and females and males on *Prunus americana* L. var. *ansu* Maxim.

(43) *Andrena* (*Micrandrena*) *brassicae* Hirashima

Andrena (*Micrandrena*) *brassicae* Hirashima, 1957, Mushi, 30 (9): 52, female and male.

This species is a close relative of *Andrena subopaca* Nylander of Europe but is easily distinguishable from the latter by the combination of characters such as the larger size, more tessellate clypeus and less hairy and much less coarsely sculptured mesoscutum in the female, and the absence of the black hairs on the head and smoother mesoscutum in the male.

This and the following species are related so closely each other that it seems probable to me that they have been frequently confused, and what was recorded as *Andrena subopaca* from Japan previously may belong either to the present species or to the following one. I am inclined to think that real *subopaca* does not occur in Japan.

This species occurs throughout in Japan and has been collected from March to August.

Female: Length 6-7 mm.

Colour: Black; mandibles broadly reddened apically; flagellum brownish beneath; wings slightly smoky, veins and stigma brown; tegulae brownish black or occasionally partly piceous, with small segments of tarsi subhyaline posteriorly, blackened anteriorly; legs reddish brown or brownish; tibial spurs pale; posterior margins of metasomal terga narrowly obscurely reddish brown.

Pubescence: Hairs on body rather short to short, scanty; hairs on clypeus short, sparse, white; hairs on face longer than those on clypeus, nearly white; facial fovea bright, silvery, slightly brownish above (hardly brownish in *subopaca*); hairs on occiput and cheeks whitish to white; hairs on mesoscutum scanty, very pale yellowish brown; hairs on scutellum longer and a little darker than those on mesoscutum; dorsal fringe of propodeal corbicular rather scanty, composed of long, more or less well arranged, branched hairs; interior of corbicular with sparse simple hairs; mesopleuron hairy anteriorly, with short sparse hairs or broadly free of hairs posteriorly; trochanteral floccus imperfect, scanty, whitish; femoral floccus rather dense, silvery; tibial scopa more or less compact, composed of rather short, somewhat well arranged, bright hairs which appear yellowish.

lowish in some light (brownish above in *subopaca*); metasomal terga with sparse cilia slightly yellowish; posterior margins of 2nd and 3rd metasomal terga with lateral fringes of short, dense, appressed, white hairs (nearly absent in *subopaca*); caudal fimbria bright, brownish (paler than in *subopaca*).

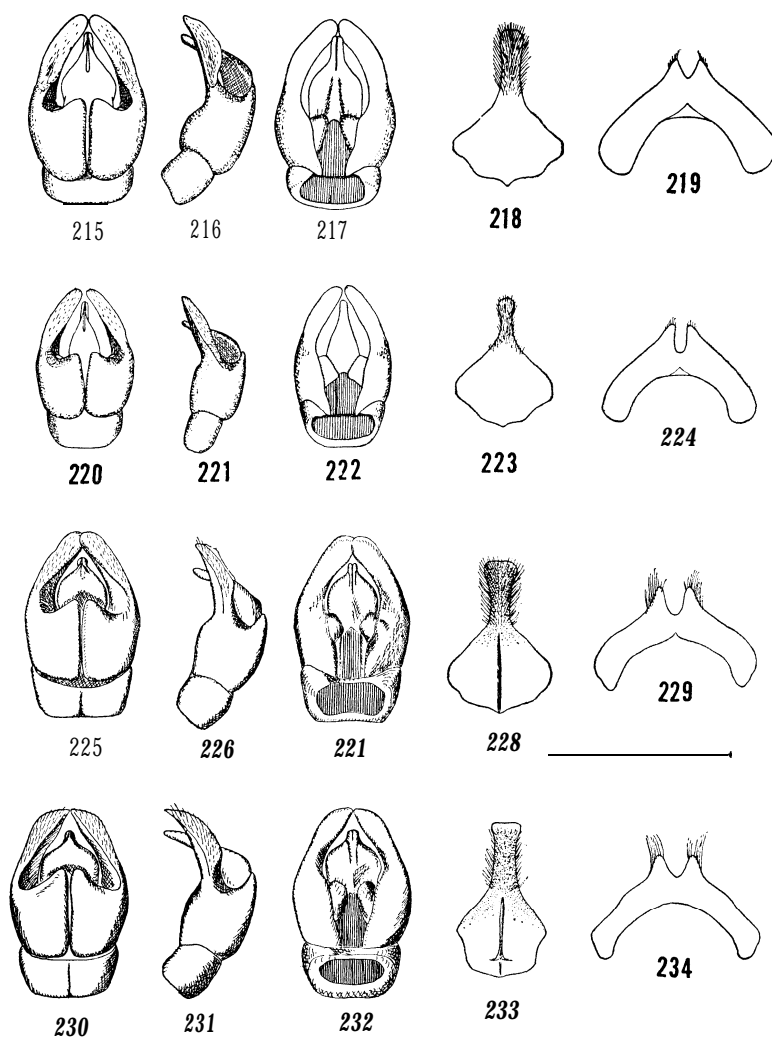
Structure: Head of moderate size, about as broad as thorax seen from above; mandibles moderately long, robust; malar space linear; process of labrum slightly broader than long, with apex entire; clypeus well convex, tessellate all over (more evidently so that in *subopaca*), weakly and sparsely punctate; clypeus slightly exceeding line running bases of eyes, its index about 1.1 : 0.9; frons more coarsely striate than in *subopaca*; facial fovea not sharply indicated above, separated from eye by a narrow space; antennae moderately long, with 3rd segment about equal to next two segments together; ratio of postocellar width to ocellocapital distance to postocellar distance to ocellocular distance is 1.2 : 0.9 : 2.5 : 3; cheeks about as broad as eyes seen in profile, rather receding, nearly weakly shagreened. Mesoscutum tessellate, scattered with weak punctures which are slightly weaker than those on clypeus, slightly shiny (shagreened, impunctate and nearly dull in *subopaca*); scutellum less tessellate and punctate than in mesoscutum; propodeum densely rugulose or nearly roughened; enclosure poorly defined, large, a little more coarsely sculptured than dorsal face of propodeum, nearly rugose basally to rugulose apically; lateral face of propodeum as well as posterior portion of mesopleuron finely tessellate; more than anterior half of mesopleuron shagreened. Wings with pterostigma large; 2nd submarginal cell receiving 1st recurrent vein about middle of cell; basal vein slightly distad of nervulus; 2nd transverse cubitus ending close to pterostigma. Legs with mid basitarsi scarcely expanded medially; posterior spurs of hind tibia normal. Metasomal terga densely tessellate, with sculpture becoming weaker toward apical terga (that is, 4th tergum much more weakly tessellate than 1st), impunctate, feebly shiny; posterior depressions of 2nd to 4th terga more or less well indicated, more weakly sculptured than elsewhere of each tergum.

Male: Length 5-6 mm.

Colour: Black; mandibles reddened apically; flagellum obscurely brownish beneath; wings brownish subhyaline, veins and stigma brown; tegulae brownish subhyaline posteriorly, blackened anteriorly; legs nearly black or deep piceous, small segments of tarsi brownish; posterior margins of metasomal terga obscurely reddish brown.

Pubescence: Hairs on body short, scanty, nearly uniformly dull white except for brownish hairs on apical metasomal terga; head without brownish or black hairs; hairs on clypeus short, sparse, not forming covering of hairs apically; hairs on mesoscutum sparse, occasionally indistinctly brownish; posterior margins of 2nd and 3rd metasomal terga with lateral fringes of short, appressed, white hairs.

Structure: Head of moderate size, about as broad as thorax seen from above; mandibles rather short, more or less robust; malar space linear; process of labrum more or less trapezoid, reflected at tip; clypeus well convex, tessellate basally, weakly so or nearly smooth and shiny apically (densely tessellate or weakly nearly shagreened in *subopaca*), with more or less dense, distinct punctures; clypeus very slightly exceeding line running bases of eyes, its index about 1.4 : 0.5 (clypeus much more exceeding in *subopaca*); facial quadrangle longer than broad (about 5.3 : 4.1); antennae rather long, with 3rd segment as long as



Figs. 215-234. Genitalia and associated structures of male *Andrena* (*Micrandrena*). Figs. 215-219: ***hikosana*** Hirashima, 215: dorsal view of genitalia, 216: lateral view of the same, 217: ventral view of the same, 218: 8th sternum, 219: 7th sternum. Figs. 220-224: ***brassicae*** Hirashima, 220: dorsal view of genitalia, 221: lateral view of the same, 222: ventral view of the same, 223: 8th sternum, 224: 7th sternum. Figs. 225-229: ***kaguya*** sp. nov., 225: dorsal view of genitalia, 226: lateral view of the same, 227: ventral view of the same, 228: 8th sternum, 229: 7th sternum. Figs. 230-234: ***komachi*** sp. nov., 230: dorsal view of genitalia, 231: lateral view of the same, 232: ventral view of the same, 233: 8th sternum, 234: 7th sternum.

wide, about as long as or occasionally indistinctly longer than 4th; 5th indistinctly longer than broad; ratio of postocellar width to ocelloccipital distance to post-ocellar distance to ocellocular distance is 1.3 : 1.0 : 2.7 : 3.0; cheeks narrower than large eyes seen in profile, receding, nearly shagreened. Mesoscutum tessellate, weakly shiny, weakly and sparsely punctate with punctures weaker than those on clypeus; sculpture of mesoscutum much finer than in *subopaca*; scutellum well convex, sculptured nearly as in mesoscutum or a little more smoother; propodeum roughened; enclosure poorly defined, large, more strongly wrinkled than dorsal face of propodeum; mesopleuron shagreened. Wings nearly as in female. Legs slender, as usual. Metasoma weakly shiny; 1st tergum weakly tessellate with microscopical, rather sparse to more or less dense punctures; 2nd weakly tessellatepunctate, following terga tessellate with punctures hardly noticeable; posterior depressions more or less well indicated, impunctate. Genitalia and subgenital sterna as illustrated.

Distribution : Japan (Hokkaido, Honshu and Kyushu).

Specimens examined: A long series of specimens taken in Hokkaido, Honshu and Kyushu has been examined.

Flower records: This species is primarily found on the flowers of *Brassica* spp. and *Potentilla* spp., and further on some flowers such as *Rosa wichuraiana* Crepin, *Cimicifuga simplexramosa* Maximowicz, and *Dasyphora fruticosa* Rydberg, *Prunus americana* L. var. *ansu* Maxim. and *Malus pumila* Mill. var. *dulcissima* Koidz.

(44) *Andrena* (*Micrandrena*) *kaguya* sp. nov.

This is a sibling species to *Andrena brassicae* Hirashima, with the mesoscutum much more tessellate (nearly shagreened) and slightly more densely punctate. The male is rather easily distinguished from *brassicae* by the presence of covering of downy hairs on the clypeus which is much more coarsely sculptured than in *brassicae*.

This species more closely resembles *Andrena subopaca* Nylander rather than it does to *Andrena brassicae* Hirashima. However, the female of *kaguya* is separated from that of *subopaca* by the clypeus more tessellate, the antennae slightly more elongate, and the mesoscutum evidently more punctate, and the male is distinguished from *subopaca* primarily by the absence of blackish hairs on the head and the elongate antennae.

Female: Length about or more than 7 mm., occasionally smaller.

Colour: Black: mandibles reddened apically; flagellum beneath obscurely brownish; wings slightly brownish subhyaline, with stigma brown, veins paler; tegulae brownish subhyaline posteriorly, blackish brown anteriorly; legs with small segments of tarsi brownish; tibial spurs pale; posterior margins of metasomal terga narrowly and obscurely reddish brown.

Pubescence: Hairs on body rather short to short, those on head and thorax more or less dense and those on metasoma scanty; hairs on head pale to white, without brownish ones; facial fovea bright, very slightly brownish or yellowish in some light; hairs on mesoscutum denser than in *brassicae*, primarily shorter than in *subopaca*, pale ochreous; hairs on scutellum longer than those on mesoscutum; propodeal corbicular with dorsal fringe of long, more or less well arranged,

whitish hairs ; interior of corbícula with sparse simple hairs; hairs on legs pale to white; trochanteral floccus imperfect, scanty, white ; femoral floccus silvery ; tibial scopa more or less compact, composed of rather well arranged, moderately long to rather short hairs; tibial scopa bright, silvery, very slightly and narrowly brownish above basally; discs of 1st and 2nd metasomal terga nearly bare ; cilia on terga pale; posterior margins of 2nd and 3rd metasomal terga with lateral fringes of rather dense, appressed, white hairs; caudal fimbria scanty, bright, nearly pale yellowish brown.

Structure: Head of moderate size, about as broad as thorax seen from above; mandibles rather long, more or less robust; malar space linear; process of labrum slightly broader than long, with apical margin rounded; clypeus well convex, densely tessellate, scattered with weak punctures, dull ; clypeus slightly exceeding line running bases of eyes, its index about 1.3 : 0.9; facial quadrangle longer than broad (about 5.9 : 4.9); antennae longer than in *brassicae* and *subopaca*, with 3rd segment more than one and one-half times as long as broad, shorter than 4th plus 5th; 4th segment indistinctly broader than long, 5th as long as broad and 6th very slightly longer than broad; facial fovea separated from eye margin by a shiny space, with upper end not sharply indicated; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.2 : 0.7 : 2.6 : 3.5, cheeks about as broad as eyes seen in profile, slightly receding, nearly shagreened posteriorly. Mesoscutum feebly shiny, nearly shagreened with small, more or less dense punctures which are almost as large as those on clypeus; scutellum very slightly convex, less tessellate than in mesoscutum, therefore a little more shiny ; propodeum roughened ; enclosure large, poorly defined, densely wrinkled basally with rugae weakened towards apex where nearly shagreened; mesopleuron broadly shagreened anteriorly, densely tessellate posteriorly. Wings with pterostigma large ; 2nd submarginal cell receiving 1st recurrent vein about middle of cell; basal vein interstitial with or distad of nervulus ; vein 2nd transverse cubitus very close to pterostigma. Legs with middle basitarsi slender, a little narrower than hind basitarsi; posterior spur of hind tibia normal. Metasomal terga tessellate, impunctate, weakly shiny ; posterior depressions not well indicated, more weakly tessellate and shiny than elsewhere.

Male: Length about 6 mm.

Colour: Black ; mandibles reddened apically ; flagellum obscurely reddish brown beneath; wings slightly brownish subhyaline ; stigma brown or nearly reddish brown, veins paler; tegulae brownish or reddish brown subhyaline posteriorly, blackish anteriorly ; legs with small segments of tarsi brownish; posterior margins of metasomal terga obscurely reddish brown.

Pubescence: Hairs on head and thorax more or less long, not dense, those on metasoma short and scanty; hairs on body pale to white, not mixed with brownish or blackish one on any portion ; hairs on clypeus long, downy, white; posterior margins of 2nd and 3rd metasomal terga with lateral fringes of sub-erect, not specially dense, white hairs; hairs on 6th metasomal terga slightly yellowish.

Structure: Head of moderate size, a little broader than thorax seen from above; mandibles moderately long, rather robust; malar space linear; process of labrum broader than long, reflected at tip; clypeus much more coarsely sculptured than in *brassicae*, well convex, nearly shagreened with an indication of small, rather dense, more or less roughened punctures; clypeus slightly exceeding line

running bases of eyes, its index 1.2 : 0.8; facial quadrangle longer than broad (about 5 : 4); antennae rather elongate with 3rd segment as long as broad, indistinctly longer than 4th which is indistinctly broader than long; 5th and following segments longer than broad ; intermediate segments of antennae more elongate than in *subopaca*; ratio of postocellar width to ocellocapital distance to postocellar distance to ocellocular distance is 1.0 : 0.7 : 2.6 : 3.4; cheeks slightly narrower than eyes seen in profile, receding, shagreened. Mesoscutum feebly shiny, shagreened with an indication of sparse and very weak punctures which are much weaker than those on clypeus; scutellum slightly convex, sculptured nearly as in mesoscutum; propodeum roughened; enclosure large, poorly defined, coarsely wrinkled with wrinkles stronger than those on dorsal face of propodeum; mesopleuron nearly roughened. Wings nearly as in female. Legs slender, as usual. Metasomal terga tessellate, impunctate, weakly shiny ; posterior depressions not well indicated, much less tessellate and more shiny than elsewhere. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Kyushu).

Typematerial: Holotype male, allotype female, on the flowers of *Brassica campestris*, Fukuoka, Kyushu, 22. iii. 1952 (Y. Hirashima); 2 paratopotype males and 1 paratopotype female, same data as holotype.

A long series of female specimens taken in Hokkaido, Honshu and Kyushu has been examined. Almost all the material seems to belong to the present species but I hesitate to include them in the type material because of the lacking of the sufficient male specimens for accurate identification.

Flowerrecord: *Brassica campestris* Linnaeus.

(45) *Andrena* (*Micrandrena*) *komachi* sp. nov.

This species is very close to *Andrenakaguya* Hirashima but is readily distinguished by the mesoscutum much more strongly and densely punctate and the metasomal terga, especially the 1st tergum, much less tessellate and, therefore, much more shiny. The enclosure of propodeum is more strongly wrinkled than *kaguya*. In the female, the tibial scopa is composed of shorter hairs, the tergal hair fringes thicker, and the posterior margins of the 2nd to 4th metasomal sterna each with a complete fringe of dense whitish tomentum. These sternal fringes of tomentum are more conspicuous in the male than in the female, and they are almost unnoticeable in *kaguya*. The male of the present species is easily separated from that of *kaguya* by the clypeus much more densely covered with long, downy, snow white hairs, and the antennae relatively shorter with the 4th segment distinctly broader than long.

This species has been collected from late April to late May. So far as my collecting data are concerned, this species primarily associates with the flowers of *Rosa* and *Potentilla*.

Female: Length 6-6.5 mm.

Colour: Black ; mandibles reddened apically ; flagellum beneath obscurely reddish brown ; wings very slightly brownish subhyaline with stigma brown or reddish brown ; veins pale brown; tegulae brownish transparent posteriorly, blackish anteriorly; legs with small segments of tarsi brownish ; tibial spurs pale; posterior margins of metasomal terga narrowly reddish brown.

Pubescence: Hairs on head and thorax short to more or less long, more or less dense, those on metasomal terga scanty; hairs on head primarily white; brownish above; hairs on thorax very pale ochreous above; facial fovea bright, silvery; dorsal fringe of propodeal corbicula long, more or less well arranged; interior of corbicula with sparse simple hairs; tibial scopa imperfect, scanty, white; femoral floccus silver white; tibial scopa rather scanty, composed of short, more or less arranged hairs which are distinctly shorter than in **kaguya**; tibial scopa bright, silver white, narrowly and obscurely brownish above basally; disc of 1st metasomal tergum bare; cilia on following terga sparse, white; posterior margins of 2nd and 3rd metasomal terga with large fringes of appressed white hairs laterally; these fringes thicker than in **kaguya**; posterior margin of 4th tergum with sparse white hairs not forming distinct fringe; caudal fimbria rather scanty, bright, slightly brownish; posterior margins of 2nd to 4th metasomal sterna each with a complete fringe of dense whitish tomenta.

Structure: Head of moderate size; vertex well exceeding line running summits of eyes and arched in front view (vertex slightly exceeding line running summits of eyes and vey slightly arched in front view in **kaguya**); mandibles moderately long, robust; malar space linear; process of labrum trapezoid or apical margin rounded, entire; clypeus well convex, shagreened, with an indication of rather sparse, small, more or less roughened punctures, dull; clypeus slightly exceeding line running bases of eyes, its index about 1.3 : 1.0; facial quadrangle longer than broad (about 6.2 : 5.2); antennae more or less short, with 3rd segments slightly less than twice as long as broad, approximately as long as next two segments together which are broader than long respectively; 6th and following segments approximately as long as broad; facial fovea separated from eye margin by a narrow shiny space, with upper end not sharply indicated; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.1 : 1.0 : 3.0 : 3.7; cheeks about as broad as eyes seen in profile, more roughened than clypeus. Mesoscutum weakly tessellate with small, dense, a little roughened punctures which are stronger and closer than in **kaguya**; mesoscutum more shiny than in **kaguya**, roughened anteriorly; scutellum nearly flat, weakly tessellate, more sparsely punctate and more shiny than in mesoscutum, propodeum quite coarsely sculptured with wrinkles stronger than in **kaguya**; enclosure large, well indicated, irregularly wrinkled all over with wrinkles not at all weakened at apex (wrinkles weakened and nearly shagreened at apex in **kaguya**); mesopleuron nearly roughened anteriorly, shagreened posteriorly. Wings with pterostigma large; 2nd submarginal cell receiving 1st recurrent vein before middle of cell; basal vein interstitial with or slightly distad of nervulus, occasionally basad of nervulus; vein 2nd transverse cubitus ending close to pterostigma. Legs with mid basitarsi a little expanded medially, subequal to hind basitarsi in width. Metasoma shiny, 1st tergum especially so; 1st tergum nearly smooth, scattered with microscopical fine punctures, or sometimes weakly to more or less distinctly tessellate basally; 2nd and following terga distinctly tessellate, with an indication of sparse, microscopical punctures; posterior depressions of 2nd to 4th terga very broad (much broader than in **kaguya**), much less tessellate than elsewhere, impunctate.

Male: Length about 5 mm.

Colour: Black; mandibles reddened apically; flagellum obscurely brownish

beneath ; wings slightly smoky, stigma nearly reddish brown, veins paler; tegulae brownish subhyaline posteriorly, blackish anteriorly ; legs with small segments of tarsi brownish; posterior margins of metasomal terga reddish brown to brownish subhyaline.

Pubescence: Clypeus densely covered with long, downy, snow white hairs; hairs on the rest of head sparser, white; hairs on thorax rather long, dense, whitish above, white below; hairs on the head and thorax denser than in *kaguya*; metasoma much more hairy than in *kaguya* with hairs short, fine, nearly white; posterior margins of 2nd and 3rd metasomal terga with lateral fringes of dense, subappressed, white hairs which are much more conspicuous than in *kaguya*; similar and much sparser hairs present on posterior margin of 4th tergum; hairs on 6th tergum slightly yellowish; posterior margins of 2nd to 5th metasomal sterna each with a complete fringe of more or less long, dense, suberect, white hairs.

Structure: Head of moderate size, indistinctly broader than thorax seen from above ; mandibles rather short and robust ; malar space linear; process of labrum transverse, slightly convex, apex entire ; integument of clypeus nearly hidden by covering of hairs; clypeus well convex, weakly tessellate and densely punctured, slightly roughened, with punctures denser and coarser than in *kaguya*; clypeus slightly exceeding line running bases of eyes, its index about 1.3 and 0.8; facial quadrangle longer than broad (about 5.5 : 4.3); antennae rather long, with 3rd segments lightly longer than broad, 4th segment broader than long, 5th and following segments indistinctly longer than broad; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.0 : 0.9 : 2.8 : 3.5; cheeks slightly narrower than large orbit seen in profile, much receding, nearly shagreened. Mesoscutum nearly shagreened with dense, small, somewhat roughened punctures, nearly roughened anteriorly ; punctures on mesoscutum much coarser and denser than in *kaguya*; scutellum with punctures a little sparser than in mesoscutum ; propodeum coarsely sculptured with strong rugae ; enclosure large, poorly defined, strongly wrinkled with wrinkles not at all weakened at apex; mesopleuron nearly roughened anteriorly, shagreened posteriorly. Wings nearly as in female. Legs slender, as usual. Metasomal terga, especially 1st tergum, well shining ; 1st tergum nearly smooth or microscopically tessellate, scattered with microscopical punctures ; 2nd tergum weakly tessellate-punctate, following terga with sculptures becoming weaker toward apical terga; posterior depressions of 1st to 5th terga not well indicated, more finely sculptured than elsewhere, impunctate. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (western Honshu and Kyushu).

Type material : Holotype male and 9 paratopotype males, Tachibanayama, Fukuoka, Kyushu, 21. iv. 1951 (Y. Hirashima); allotype female and 7 allotopotype females, on flowers of *Rosa* and *Potentilla*, Wajiro, Fukuoka, Kyushu, 12. v. 1960 (Y. Hirashima); 4 paratype females, on *Potentilla*, Kashii, Fukuoka, 2. v. 1959 (Y. Hirashima); 11 paratype females, Sengokudai, near Hagi, Yamaguchi Pref., 23. v. 1960 (Y. Hirashima).

Flower records: Females have been collected on the flowers of *Lactuca stolonifera* Maximowicz, *Rosa multiflora* Thunberg, *Potentilla fragarioides* L. var. *sprengeliana* Maximowicz and *Potentilla wallichiana* Del.

12. Subgenus *Mitsukuriella* Hirashima et LaBerge, nov.

Glyphandrena Hedicke, 1933, Mittl. 2001. Mus. Berlin, 19 : 213; Hirashima, 1952, Mushi, 24 (10) : 63.

Type-species: *Nomia japonica* Smith, 1873 (= *Andrena mitsukurii* Cockerell 1913).

Diagnosis: The subgenus is composed of the moderate-sized species. It is primarily characterized by the enclosure of the propodeum "grob gerunzelt" and the apex bounded by a strong carina as in *Glyphandrena. Mitsukuriella*, however, is distinguished from *Glyphandrena* by the metasomal terga being reflected above apically. The subgenus is further characterized in having the dorsal face of the propodeum as well as the mesopleuron very coarsely sculptured and the posterior depressions of the metasomal terga sharply indicated. The propodeal corbicula is not specially well developed, the trochanteral floccus perfect and the tibial scopa compact.

The subgenus is represented by two species in Japan.

Description: Medium-sized to large species, integument black. Head moderate in size; process of labrum rather small, nearly flat, with apical margin nearly entire or slightly emarginate; malar space well indicated; inner margins of eyes subparallel; thorax with or without black pubescence; enclosure of propodeum strongly and coarsely wrinkled, and carinate posteriorly; dorsal face of propodeum as well as mesopleuron coarsely sculptured with an indication of strong and close punctures; fore wings with three submarginal cells; wings occasionally strongly brownish; metasoma with or without strong punctures; posterior depressions of metasomal terga sharply indicated.

Female: Facial fovea wide, separated from eye margin by a narrow punctate space; antennae with 3rd segment longer than next two segments together; dorsal fringe of propodeal corbicula more or less long, dense, but not well arranged; interior of corbicula with sparse, rather short to more or less long, rather fine, simple hairs; trochanteral floccus nearly perfect to perfect, dense; tibial scopa compact, outer face composed of simple hairs; mid basitarsi slightly expanded medially, subequal to hind basitarsi in width; posterior spur of hind tibia widened and curved near base; posterior margins of metasomal terga with or without hair fringes.

Male: Clypeus black; mandibles moderate; antennae with 3rd segment variable, at least as long as broad, shorter or longer than next segment; cheeks moderately developed to receding; genitalia robust, with parapenial lobe produced and pointed apically; paramere robust, not expanded apically; aedeagus rather small, with sides not excavated.

(46) *Andrena (Mitsukuriella) japonica* (Smith)

Nomia japonica Smith, 1873, Trans. Ent. Soc. London, 1873: 201, female; Dalla Torre, 1896, Cat. Hym., 10: 167.

Andrena anthracina Matsumura (nec Morawitz), 1912, Thous. Ins. Japan., Suppl., 4: 207, pl. 54, fig. 18; Matsumura, 1930, Illustr. Thous. Ins. Japan, 2: 176, pl. 17, fig. 18; Matsumura, 1931, 6000 Illustr. Ins. Japan-Emp., 3; Matsumura, 1932, Illustr. Comm. Ins. Japan, 4: 6 (8), pl. 2, fig. 7; Tosawa, 1932, List. Ins. Minoo Park, Osaka: 101.

Andrena mitsukurii Cockerell, 1913, Ann. Mag. Nat. Hist., (8) 11 : 186, male ; Tosawa, 1932, List Ins. of Minoo Park, Osaka : 102; Yasumatsu, 1938, Ins. Jap. Illustr. Icon. Colour. ad. Nat. Depicta : 378, pl. 168, fig. 658-2, female; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15 : 278.

Andrena japonica Meado-Waldo, 1916, Ann. Mag. Nat. Hist., (8) 17: 462; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15 : 277 ; Yasumatsu, 1950, Icon. Ins. Jap., 2nd ed.: 1482, fig. 4280; Uéda, 1954, Trans. Shikoku ent. Soc., 4 : 50 ; Takeuchi, 1955, Col. Illustr. Ins. Japan : 138, pl. 62, fig. 978.

Andrena (Glyphandrena) mitsukurii Hedicke, 1933, Mitt. 2001. Mus. Berlin, 19 : 213.

This species is quite distinct in having the metasomal terga usually extremely densely and rather strongly punctate, with the posterior margins strongly reflected above. Therefore, the recognition of this species is very easy.

This species appears once a year. Adults fly from about end of May to mid June. They are rather common, usually frequently found on the flowers of carrot.

Female: Length about or slightly over 12 mm.

Colour: Black ; mandibles reddened apically ; basal tubercles of mandibles reddened ; flagellum beneath reddish brown ; wings distinctly brownish with distal margins more darkened ; veins and stigma deep brown; tegulae deep reddish brown ; legs nearly piceous ; hind tibiae and tarsi obscurely to sometimes distinctly reddened ; small segments of tarsi reddish brown; tibial spurs pale ferruginous; posterior margins of metasomal terga deep reddish brown or nearly piceous.

Pubescence: Hairs on body rather scanty; hairs on clypeus sparse, rather fine, those on sides of face rather dense, those on occiput and cheeks rather short, all dull white; hairs on frons, vertex and cheeks above brown ; facial fovea deep brown above, whitish below; hairs on mesoscutum short, not specially dense, brown or fuscous, paler on periphery; hairs on scutellum brown, longer and paler laterally and posteriorly; hairs on metanotum brownish; hairs on propodeum and on sides of thorax nearly dull white or faintly yellowish; propodeal corbicula with dorsal fringe of rather short, not well arranged, more or less dense hairs ; interior of corbicula hairy throughout; trochanteral floccus perfect, not large, nearly dull white; femoral floccus nearly silver white; tibial scopa nearly silver white or faintly yellowish, brown above basally; tibial scopa rather large, compact, composed of well arranged, long to rather long hairs; 1st metasomal terga with rather long, following three terga with short, somewhat dense, dull white to slightly brownish hairs; posterior margin of 4th tergum with a nearly entire band of short, snow white hairs which is not always distinct, occasionally lacking; caudal fimbria blackish brown, whitish laterally.

Structure: Head moderate in size; mandibles moderately long, robust; malar space well indicated, about one-fifth time as long as base of mandible; process of labrum moderate in size, slightly reflected at apex; clypeus well convex, very closely and more or less coarsely punctate, with a trace of median line; clypeus only slightly exceeding line running bases of eyes, its index about 3 : 1; antennae with 3rd segment longer than next two segments together; frons punctate nearly as in clypeus; ratio of postocellar width to ocellocapital distance to postocellar distance to ocellular distance is 1.8 : 2.8 : 4.5 : 6.5; cheeks about as broad as eyes, rather convex, nearly smooth and shiny above, with punctures becoming denser and coarser beneath. Mesoscutum nearly smooth and shiny, rather strongly

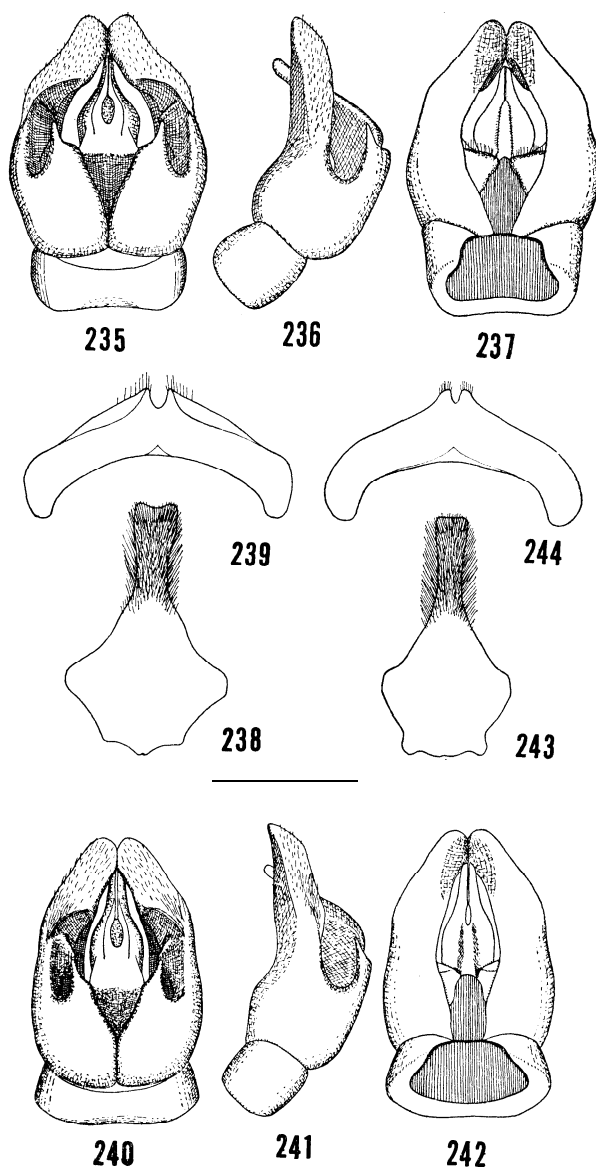
punctate with punctures irregular in distribution, contiguous to several puncture widths apart; scutellum nearly flat, shiny, coarsely punctate; propodeum strongly roughened and quite coarsely sculptured, dull, enclosure well defined, strongly and coarsely carinate, strongly carinate posteriorly; lateral face of propodeum rugose; mesopleuron extremely densely and strongly punctate, nearly coarsely sculptured. Wings with 2nd submarginal cell receiving 1st recurrent vein about or slightly beyond middle of cell; basal vein almost interstitial with nervulus. Legs with mid basitarsi indistinctly expanded medially, slender than hind basitarsi; posterior spur of hind tibia widened basally. Metasomal terga quite closely and rather strongly punctate or occasionally punctures weak and rather sparse; interspaces of punctures smooth and shiny; bases of 2nd to 4th terga deeply concave; posterior margins of 1st to 4th terga sharply constricted subapically, strongly reflected apically, impunctate.

Male: Length 10-12 mm.

Colour: Black; mandibles reddened apically; flagellum beneath reddish brown; wings distinctly brownish, with distal margins more darkened; veins and stigma deep brown or sometimes the latter reddish brown; tegulae deep reddish brown, more blackened anteriorly; legs nearly piceous, small segments of tarsi and apices of basitarsi reddish brown; posterior depressions of 1st to 4th metasomal terga slightly reddened, those of 5th and 6th brownish.

Pubescence: Hairs on head especially those on face and cheeks below, more or less long and dense, hairs on clypeus dull white, usually mixed with sparse to dense brownish hairs; hairs on sides of face, frons and cheeks near eyes brownish to fuscous; hairs on mesoscutum short, not dense, brownish to fuscous; hairs on scutellum short and fuscous anteriorly, longer and paler posteriorly; hairs on propodeum rather, long more or less dense, with or without admixture of sparse to dense brown hairs; hairs on tubercles and on upper portion of mesopleuron sometimes predominantly fuscous; hairs on the rest of mesopleuron rather short, whitish, hairs on metasomal terga rather dense, those on 1st rather long, those on following terga shorter, erect to suberect; hairs on basal three terga dull white, those on 4th tergum white and brown, those on following terga brown to fuscous; posterior margin of 4th tergum with fringe-like, short, white hairs in fresh specimens.

Structure: Head moderate in size; mandibles rather short, robust; malar space about one-fifth time as long as base of mandible, slightly widened posteriorly; process of labrum more or less small, slightly emarginate and reflected at tip; clypeus well convex, quite densely and coarsely rugoso-punctate; clypeus slightly exceeding line running bases of eyes, its index 2.1 : 1.2; facial quadrangle slightly longer than wide (about 9 : 7.7); antennae rather long, with 3rd segment slightly longer than wide, indistinctly longer than 4th and about as long as 5th; frons densely rugoso-punctate, not longitudinally striate; ratio of postocellar width to ocellocipital distance to postocellate distance to ocellocular distance is 1.7 : 2.7 : 5 : 5.7; ocellocular spaces deeply concave; cheeks narrower than large eyes seen in profile, much receding, weakly punctate and shiny. Mesoscutum somewhat strongly and coarsely punctate with punctures irregular in distribution, interspaces smooth and shiny; scutellum more or less well convex, coarsely nearly rugoso-punctate, shiny; propodeum quite coarsely sculptured, dull; enclosure strongly and irregularly carinate; mesopleuron strongly and quite closely rugoso-punctate, nearly roughened. Wings nearly as in female. Legs without special modification.



Figs. 235-244. Genitalia and associated structures of male *Andrena* (*Mitsukurilla*). Figs. 235-239: *japonica* Smith, 235: dorsal view of genitalia, 236: lateral view of the same, 237: ventral view of the same, 238: 8th sternum, 239: 7th sternum. Figs. 240-244: *fukaii* Cockerell, 240: dorsal view of genitalia, 241: lateral view of the same, 242: ventral view of the same, 243: 8th sternum, 244: 7th sternum.

Metasomal terga densely and strongly punctate ; posterior margins of 1st to 4th metasomal terga strongly reflected above, impunctate ; bases of intermediate terga deeply concaved basally. Genitalia and subgenital sterna as illustrated.

Specimens examined : A series of male and female specimens taken in Honshu and Kyushu were examined.

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

Biology : The nest of this species is described elsewhere in this paper.

Flower records : Female has been collected on the flowers of *Daucus carota* L. and *Ligustrum japonicum* Thunberg.

Parasite : An undescribed species of *Nomada* which is related to the European *Nomada hillana* Kirby is parasitic on this species.

(46) *Andrena (Mitsukuriella) fukaii* Cockerell

Andrena fukaii Cockerell, 1914, Ann. Mag. Nat. Hist., (8) 13 : 279, female ; Yasumatsu, 1941, Peking Nat. Hist. Bull., 19: 276; Uéda, 1954, Trans. Shikoku ent. Soc., 4 : 50.

Andrena (Glyphandrena) fukaii Hedicke, 1933, Mitt. Zool. Mus. Berlin, 19 : 213.

This species is a close relative of *Andrena japonica* (Smith). It is readily separated from the latter in having the wings and pubescence much paler and the metasomal terga more weakly and sparsely punctate with the apical reflections weaker.

Adults of *Andrena fukaii* appear afield much earlier than *Andrena japonica*, and associate primarily with the flowers of *Brassica*. I had thought that *Andrena japonica* may be conspecific with *Andrena fukaii* and may correspond to the second generation of that species. It is not yet ascertained by means of the biological observation but now I am inclined to think that it is a distinct species.

Female : Length 11—12 mm.

Colour : Black ; mandibles reddened apically ; often basal tubercles of mandibles reddened ; flagellum beneath reddish brown ; wings slightly brownish subhyaline, with distal margins darkened ; veins and stigma brownish ; tegulae deep reddish brown posteriorly, blackish anteriorly ; legs piceous, hind tibiae and basitarsi slightly reddened ; small segments of tarsi reddened, tibial spurs pale yellowish brown ; posterior margins of metasomal terga broadly reddened, usually more distinctly so than in *japonica*.

Pubescence : Hairs on face not specially long and dense, dull white ; hairs on frons, vertex and cheeks above brownish ; facial fovea deep brown above, whitish below ; hairs on thorax above much paler than in *japonica*, pale yellowish brown, intermixed with sparse brownish hairs on mesoscutum, hairs on propodeum paler ; propodeal corbicula with dorsal fringe of somewhat dense branched hairs ; interior of corbicula hairy throughout ; hairs on mesopleuron somewhat long, pale ; trochanteral floccus perfect, dense, white ; femoral floccus silver white ; tibial scopa rather large, compact, silvery, narrowly brown above basally ; hairs on 1st metasomal tergum long, those on following three terga short, erect to suberect, white ; posterior margins of 3rd and 4th terga with fringe-like snow white hairs which are much more evident than in *japonica* ; caudal fimbria bright brown.

Structure : Head moderate in size ; mandibles moderately long, robust ; malar space about one-fifth time as broad as base of mandible, slightly widened pos-

tertiorty ; process of labrum rather small, reflected and nearly entire at tip ; clypeus well convex, densely and coarsely rugoso-punctate with punctures more or less larger than in *japonica*; a trace of median impunctate line on clypeus; clypeus slightly exceeding line running bases of eyes, its index about 2.6 : 1.5; facial quadrangle a little longer than broad (about 9.5 : 8.5) ; antennae with 3rd segment longer than 4th plus 5th; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.6 : 2 : 4.8 : 6; cheeks about as broad as eyes seen in profile, more or less convex, smooth and shiny, with punctures becoming larger beneath. Mesoscutum nearly smooth and shiny, strongly and a little coarsely punctate with punctures irregular in distribution, contiguous to several puncture widths apart; punctures on mesoscutum a little stronger than in *japonica*; scutellum nearly as in mesoscutum'; propodeum strongly roughened and quite coarsely sculptured ; enclosure well indicated, strongly and irregularly carinate all over, carinate posteriorly ; mesopleuron sculptured almost as in propodeum. Wings with 2nd submarginal cell receiving 1st recurrent vein slightly beyond middle of cell; basal vein interstitial with nervulus or nearly so. Legs with mid basitarsi indistinctly expanded medially subequal to hind basitarsi in width; posterior spur of hind tibia expanded basally. Metasomal terga smooth and shiny; 1st tergum rather strongly and somewhat coarsely punctate with punctures sparser than in *japonica*; 2nd to 4th terga weakly punctate with punctures considerably weaker than those on 1st and much so than in *japonica*; apical reflections of 1st to 4th terga and basal constrictions of intermediate terga much weaker than in *japonica*; posterior margins of 1st to 4th terga broadly impunctate.

Male: Length 9.5—11 mm.

Colour: Black ; mandibles reddened apically ; flagellum beneath brown ; wings slightly brownish subhyaline, with distal margine more darkened; veins and stigma brownish ; tegulae deep reddish brown or more blackened; legs nearly black or partly piceous; tarsi reddened, posterior margins of metasomal terga broadly reddened.

Pubescence: Hairs on head and thorax rather long and more or less dense, more abundant than in *japonica*, those on metasoma shorter and sparser; hairs on face, including clypeus, dull white (at least sparse brown hairs present on clypeus) to occasionally nearly all fuscous; hairs on sides of face, frons, vertex and cheeks near eyes usually fuscous; hairs on thorax nearly uniformly dull white or slightly yellowish above, rarely intermixed with brown hairs on mesoscutum; hairs on 1st to 4th metasomal terga nearly white, those on 5th brownish, those on 6th brown; posterior margins of intermediate terga with fringe-like, sparse, white hairs.

Structure: Head almost as broad as thorax seen from above; mandibles moderately long, robust ; malar space about one-fifth as long as base of mandible, slightly widened posteriorly ; process of labrum slightly emarginate apically ; clypeus well convex, strongly and coarsely rugoso-punctate, with interspaces nearly dull (shiny in *japonica*); clypeus a little more exceeding line running bases of eyes than in *japonica*, its index about 1.8 : 1.4; facial quadrangle longer than broad (about 8.3 : 7.2), antennae long, with 3rd segment approximately one and one-half times as long as broad, indistinctly longer than 4th and about as long as 5th ; frons very coarsely rugoso-punctate with punctures somewhat confluent in irregular longitudinal rows; ratio of postocella width to ocelloccipital distance

to postocellar distance to ocellocular distance is 1.5 : 1.7 : 3.8 : 5; cheeks slightly narrower than eyes seen in profile, much receding, rather coarsely punctate. Mesoscutum weakly tessellate (nearly smooth in **japonica**), strongly (stronger than in **japonica**) and somewhat coarsely punctate with punctures irregular in distribution; scutellum more coarsely punctate than in mesoscutum; propodeum quite strongly roughened, dull; enclosure strongly and irregularly carinate all over; mesopleuron roughened, nearly or a little less coarsely sculptured than in propodeum. Wings nearly as in female. Legs slender, without special modification. Metasomal terga much less punctate than in **japonica**, smooth and shiny; punctures of 1st tergum coarser than those on following terga; apical reflections of 1st to 4th terga weak, not sharply indicated as in **japonica**.

Specimens examined : A series of male and female specimens, including the allotype (male, Fukuoka, Kyushu, 17. iii. 1952, Y. Hirashima leg.), from Honshu and Kyushu were examined.

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

Flower record : Adults of this species primarily associate with flowers of **Brassica** spp., and females collected on *Malus pumila* Mill. var. *dulcissima* Koidz. and **Salix** sp. Miyamoto (1960) recorded **Brassica campestris** and **Salix yoshinoi** for this species.

13. Subgenus *Notandrena* Pérez

Notandrena Perez, 1890, Act. Soc. Linn. Bordeaux, 10 : 173; Hedicke, 1933, Mitt. 2001. Mus. Berlin, 19: 216 ; Hirashima, 1952, Mushi, **24**: 64.

Type-species: *Andrena nitidiuscula* Schenck, 1853. (By designation of Hedicke, 1933.)

Diagnosis : The subgenus is characterized by the very shiny metasoma which is finely punctate, scanty of hairs and decorated with appressed hair bands on the posterior margins of the intermediate terga. So far as this character of the metasoma is concerned, **Notandrena** is close to *Hedickella* Hirashima and La-Berge, but is distinguished by the entire process of labrum, the absence of blackish hairs on the thorax, the more coarsely sculptured mesopleuron and the more developed propodeal corbicula.

The subgenus is found in the Old World alone. Among the species listed by Hedicke, I could examine only a single species, *Andrena nitidiuscula* Schenck. Therefore, the description of the subgenus made by Hedicke is given below.

“ Kleine und mittelgrosse Arten. Schwarz, Tarsen und Hintertibien meist gelbbraun bis braun, letztere meist dunkler als die Tarsen, Fühlergeissel zuweilen unterseits ± gebräunt. Kopf und Mesonotum mässig dicht und lang abstehend in braunen Tönen behaart, ohne schwarze Haare, Gesicht und übriger Thorax weisslich behaart. Hinterleib kurz und wenig auffallend behaart, Endränder der mittleren Tergite mit schmalen, weissen, z. T. unterbrochenen Haarbinden. Tergite zerstreut fein punktiert, stark glänzend, besonders das 1. zuweilen ganz oder fast punktflos, Basis der mittleren Tergite zuweilen dichter punktiert.

♂. Gesicht zuweilen mit gelbem Clypeus und je einem gelben Seitenfleck (der auch fehlen kann), 2. Geisselglied um wenigstens die Hälfte länger als das 3., meist so lang oder fast so lang wie die beiden folgenden zusammen. Endränder der Tergite ± rötlichbraun durchscheinend, zuweilen mit nur sehr schmalen hellen Haarfransen.

♀. Scopa weiss und oben am Grunde oder ausgedehnter bräunlich, zuweilen braun und nur unten etwas weisslich. Endfranse gelbbraun bis braun, zuweilen mit hellen Haaren iiberdeckt."

The further characters of importance, based upon the type species, are as follows :

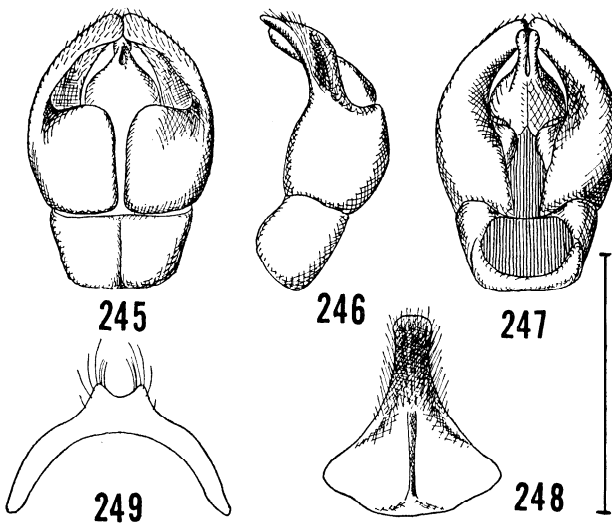
Fore wings with three submarginal cells; process of labrum transverse, entire in female, sub-protuberant in male; clypeus convex in female, scarcely so and reflected apically in male ; cheeks well developed, about as broad as eyes, carinate posteriorly in male ; enclosure of propodeum rather large, slightly roughened basally, granulate apically ; dorsal face of propodeum nearly shagreened, not roughened ; mesopleuron shagreened ; dorsal fringe of propodeal corbicula moderately long, more or less well arranged but not dense, interior of corbicula with sparse, fine, simple hairs, no fringe of hairs anteriorly; trochanteral floccus imperfect, scanty ; tibial scopa more or less loose, composed of rather long to long, more or less coarse, simple hairs; mid basitarsi of female slender, subequal to hind basitarsi in width; tibial spurs normal.

(48) *Andrena* (*Notandrena*) *nitidiuscula* Schenck

Andrena nitidiuscula Dalla Torre, 1896, Cat. Hym., 10: 142 ; Stockheart, 1930, in Schmiedeknecht, Hym. nord-u. mitteleurop. : 943 (female) and 982 (male) ; Stöckhert, 1933, Deut. ent. Zeitschr., 1932: 141; Stöckhert, 1954, Abh. Bayerischen Akad. Wiss., Neue Folge, (65): 29.

Andrena (*Notandrena*) *nitidiuscula* Hedicke, 1933, Mitt. 2001. Mus. Berlin, 19 : 216.

A short series of female specimens taken in central Honshu, Japan, is very close to a European specimen of *Andrena nitidiuscula* which is determined by



Figs. 245-249. Genitalia and associated structures of male *Andrena* (*Notandrena*) *nitidiuscula* Schenck. 245 : dorsal view of genitalia, 246: lateral view of the same, 247: ventral view of the same, 248: 8th sternum, 249: 7th sternum.

Stöckhert. It differs from the European one in having the punctures on the clypeus a little weaker and the process of labrum slightly smaller. Although I keep none of the male specimen taken in Europe to compare with those from Japan, it seems probable that the present treatment of the Japanese specimens is reasonable.

This species which is the type of the subgenus *Notandrena* Perez is usually readily recognized. The female is unique by the combination of characters such as the rather small size, the process of labrum very short and transverse, the facial fovea widely separated from the eye margin, the wings rather distinctly brownish, and the metasomal terga, especially the first, smooth and conspicuously shiny. The propodeal corbicula is hairy throughout interiorly with the dorsal fringe of rather short and scanty hairs; the trochanteral floccus is imperfect and scanty, and the tibial scopa is well developed. The male is best characterized by the clypeus which is broadly nearly flat and reflected at the apex, and the cheeks broad and carinate posteriorly.

According to Stöckhert (1933), this species appears in summer and has one generation a year. The Japanese specimens have also been collected in July and August.

Female: Length 7.5-8.5 mm.

Colour: Black; mandibles reddened apically and occasionally piceous basally; malar space reddened; flagellum beneath reddish brown; wings rather distinctly brownish, subhyaline basally; veins and stigma brown; tegulae brownish transparent posteriorly, darker anteriorly; legs piceous; basitarsi nearly reddish brown; small segments of tarsi yellowish; tibial spurs pale; abdomen not at all black, partly or broadly nearly piceous; posterior margins of terga pale yellowish transparent.

Pubescence: Hairs on body short and scanty, especially so on abdomen; hairs on head dull white; facial fovea brownish, not conspicuous; hairs on mesoscutum very sparse, long, erect, white mixed with sparse, short, suberect, brownish ones; hairs on mesopleuron moderately long, dull white; dorsal fringe of propodeal corbicula not dense, silvery, composed of not specially long, branched hairs; legs without blackish hairs; trochanteral floccus imperfect, scanty, white; narrowly brown above basally; tibial scopa well developed, with hairs on outer face and anterior margin rather coarse, rather long, simple, those on posterior margin rather short, obscurely branched; posterior margin of 2nd tergum with lateral, that of 3rd with more broad, that of 4th with a complete band of appressed, snow white hairs; caudal fimbria brownish, usually covered by silver white hairs.

Structure: Head slightly broader than thorax seen from above, distinctly transverse seen in front; mandibles moderately long, robust; malar space linear; process of labrum very short, transverse; clypeus well convex, tessellate all over or occasionally weakly so medially, somewhat coarsely and rather densely punctate, without any trace of median impunctate line; clypeus only slightly exceeding line running bases of eyes, its index 1.8 : 0.8; facial quadrangle a little longer than broad (about 6.7 : 6.2); antennae short, with 3rd segment a little longer than following two segments together which are distinctly broader than long respectively; facial fovea rather narrow, more or less deep, widely separated from eye by a shiny punctate space; ratio of postocellar width to ocellocipital distance to postocellar distance to ocellocular distance about 1.2 : 1.3 : 3.3 : 4.7; cheeks about as broad as eyes seen in profile, receding, smooth and feebly

punctate near eyes, tessellate posteriorly. Mesoscutum tessellate all over, feebly shiny, rather distinctly, and specially densely punctate with punctures weaker than those on center of clypeus; scutellum weakly convex, tessellate nearly all over, feebly shiny, very sparsely and more weakly punctate than in mesoscutum; propodeum nearly shagreened, dull; enclosure rather large, slightly more coarsely sculptured than dorsal face of propodeum, rugose to rugulose basally, granulate apically; mesopleuron shagreened medially, densely tessellate posteriorly. Wings with 2nd submarginal cell receiving 1st recurrent vein before or about middle of cell; basal vein interstitial with or distad of nervulus. Legs with mid basitarsi slender, scarcely expanded medially, narrower than hind basitarsi. Metasomal terga nearly smooth and strongly shiny; 1st tergum polished, scattered with microscopical fine punctures; 2nd nearly smooth, slightly more punctate basally; 3rd and 4th nearly smooth or feebly tessellate, punctate nearly as in 2nd; posterior depressions of terga not sharply indicated.

Male: Length 6-7 mm.

Colour: Black; mandibles reddened apically; malar space reddened; antennae nearly piceous, flagellum beneath reddish brown; wings a little paler than in female; tegulae broadly brownish transparent; legs piceous to brownish; abdomen piceous, posterior margins of terga pale yellowish transparent.

Pubescence: Hairs on head and thorax more or less long, not specially dense, those on metasoma short and scanty; hairs on face, including clypeus, and vertex dull white, those on cheeks shorter and sparser, indistinctly brownish; hairs on thorax dull white, indistinctly brownish above; hairs on legs primarily white; hairs on metasomal terga slightly brownish; posterior margins of 2nd to 4th terga with a lateral white hair patches which, however, are not usually distinct.

Structure: Head large, distinctly broader than thorax seen from above; head distinctly transverse seen in front; mandibles not specially long, slender; malar space linear; process of labrum very small; clypeus strongly reflected at apex; clypeus broadly nearly flat, broadly nearly smooth and shiny, more or less coarsely and rather densely punctate; clypeus very slightly exceeding line running bases of eyes, its index $1.7 : 0.8$; facial quadrangle slightly longer than broad (about $5.3 : 5.3$); antennae not specially long, 3rd segment about one and one-half times as long as broad, shorter than next two segments together; 4th segment distinctly broader than long, 5th about as long as broad; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance about $1.1 : 1.1 : 2.9 : 4.5$; cheeks broad, about as broad as large eyes seen in profile, nearly smooth and quite feebly punctate; posterior margins of cheeks, seen in profile, roundly convex and distinctly carinate. Mesoscutum weakly tessellate or sometimes nearly smooth medially, more or less shiny, rather sparsely punctate with punctures weaker than those on clypeus; scutellum well convex, feebly tessellate or broadly nearly smooth, therefore more shiny than in mesoscutum, sparsely and quite weakly punctate; propodeum rugulose, slightly more coarsely sculptured than in female, dull; enclosure quite indistinctly defined, sculptured nearly as in dorsal face of propodeum or a little more wrinkled basally; mesopleuron slightly less coarsely sculptured than in propodeum. Wings as in female. Legs as usual. Metasoma distinctly shiny; 1st tergum polished, nearly impunctate; 2nd and following terga nearly smooth, scattered with microscopical punctures, with posterior depressions more or less well indicated. Genitalia and subgenital sterna as illustrated.

Specimens examined : 6 males and 4 females, Karuizawa, Nagano, Honshu, 1949–1952 (K. Ishikawa); female, Otoineppu, Prov. Kamikawa, Hokkaido, 13. ix. 1956 (K. Kami jo).

Distribution: Palaearctic region. This is the first record of this species from Japan where it is found in Hokkaido and Honshu.

Flower record : Umbelliferae (Europe).

Parasite: *Nomada errans* Lepeletier is known as a parasite of this species in Europe.

The following two species which seem to represent a separate subgenus respectively are cited here since they show some resemblance to the subgenus *Notandrena*.

(49) *Andrena richardsi* Hirashima

Andrena richardsi Hirashima, 1957, Mushi, 30 : 54, female and male.

Although the female of this species deviates from *Andrena nitidiuscula* Schenck in some characters such as the process of labrum larger and broadly rounded at the apex, the interior of the propodeal corbicula with much coarse hairs, the trochanteral floccus perfect and dense, and the hind tibiae more slender, this species is best referred to the group of that species. The recognition of this species is very easy owing to the characters such as the propodeum strongly roughened, the propodeal enclosure coarsely wrinkled but not defined by a transverse carina at the apex, and the metasomal terga polished or nearly so, strongly shiny with microscopical fine punctures in both sexes.

Female: Length about or less than 11 mm.

Colour: Black, shining ; mandibles reddened apically ; basal tubercles of mandibles reddened ; flagellum brownish beneath ; tegulae brownish subhyaline posteriorly ; wings nearly subhyaline, with distal margins very slightly darkened ; veins brownish ; posterior margins of metasomal terga brownish, sometimes yellowish at apices ; legs brownish.

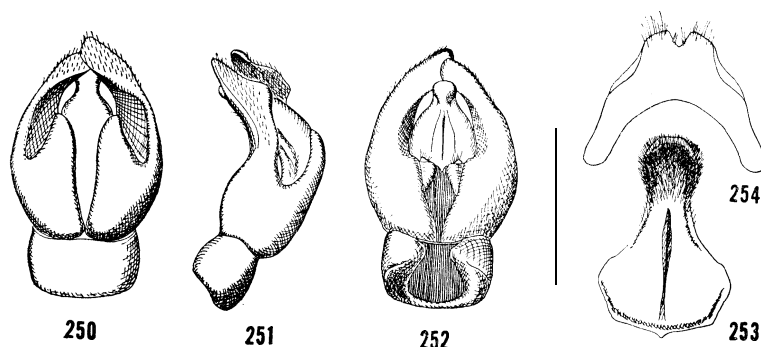
Pubescence: Hairs on head basically greyish white, not abundant ; facial fovea slightly brownish above, silvery beneath ; hairs on mesoscutum short, sparse, yellowish ; hairs on posterior margin of scutellum, metanotum and propodeum long, rather sparse, yellowish grey ; propodeal corbicula with dorsal fringe not arranged in a compact fringe, interior with sparse coarse hairs ; trochanteral floccus especially well developed with long, well curled, silvery hairs ; tibial scopa compact, silvery in front, slightly yellowish behind ; metasoma scanty of hairs, with very fine, sparse pubescence ; posterior margins of 2nd to 4th metasomal terga with lateral white hairs ; caudal fimbria golden.

Structure: Head rather thin, subquadrate in front view ; process of labrum rather small with apical margin rounded ; malar space linear ; clypeus not well convex, shiny medially with irregular punctures ; 3rd antennal segment about equal to 4th plus 5th, cheeks slightly rounded above.

Mesoscutum nearly smooth medially, with weak, sparse punctures ; scutellum nearly as in mesoscutum ; propodeum coarsely sculptured, dull ; enclosure rather well defined, strongly wrinkled all over ; mesopleuron shagreened or more coarsely sculptured, dull.

Legs slender; hind tibiae rather elongate.

Metasoma smooth basally, with microscopical reticulation becomes clear toward apical terga; 1st tergum impunctate, 2nd and the following terga with microscopical punctures.



Figs. 250-254. Genitalia and associated structures of male *Andrena richardsi* Hirashima. 250: dorsal view of genitalia, 251: lateral view of the same, 252: ventral view of the same, 253: 8th sternum, 254: 7th sternum.

Male: Length 9–10 mm.

Colour: Black; mandibles reddened apically; flagellum brown beneath; tegulae and wings as in female; tibiae and tarsi, especially the latter, brownish; posterior margins of metasomal terga more yellowish than in female.

Pubescence: Head and thorax with long, not dense, dull greyish hairs, those on sides of clypeus white and those on thorax above slightly yellowish; metasoma with sparse hairs; posterior margins of 2nd to 4th terga with lateral hair bands inconspicuous; 3rd to 5th metasomal sterna with apical fringes of curled golden hairs.

Structure: Head transverse in front view; mandibles normal; malar space linear; clypeus rather flat, nearly smooth medially, weakly and sparsely punctate; antennae somewhat long, 3rd segment one and one-half times as long as wide, much longer than 4th; cheeks distinctly depressed, rather elongate behind.

Mesoscutum nearly smooth and shiny medially, weakly punctate; propodeum and mesopleuron coarsely sculptured; propodeal enclosure wrinkled all over, with wrinkles not so strong as in female.

Metasoma nearly smooth and shiny, with very fine punctures; posterior depressions of terga weak. Genitalia and sterna as illustrated.

Distribution: Japan (Honshu, Shikoku, Kyushu).

Specimens examined: The following specimens from Honshu are recorded here. 5 females, on *Ilex* sp. (Japanese name: Akami-inutsuge), Mt. Hakkoda, Prov. Mutsu, 6. vii. 1958 (Y. Hirashima).

Flower record: *Ilex* sp.

(50) *Andrena amamiensis* Hirashima

Andrena amamiensis Hirashima, 1960, Mushi, 33 (8): 55, male and female.

The female of this species is easily recognizable in having the characters such as the strongly shiny clypeus, the deep and narrow facial fovea, the subvelvety hairs on the mesoscutum, the large enclosure of the propodeum and the highly shiny and finely punctate metasoma. I cannot refer this to any related species in our region. The male is recognizable at once in having the large head, the strongly convex and yellow clypeus, the long, stout and falciform mandibles, and the highly shiny metasoma. The male is close to *Andrena (Stenomelissa) halictoides* Smith in general appearance, but is easily distinguishable from it by the normal apical segments of the antennae.

Although some characters such as the process of labrum deeply emarginate in the female or bituberculate in the male, this species is somewhat related to the species of *Notandrena*. It seems probable that this species may represent a distinct subgenus.

This species occurs in Amami-Oshima, and appears early in spring. Females of this species have been collected on *Deutzia*.

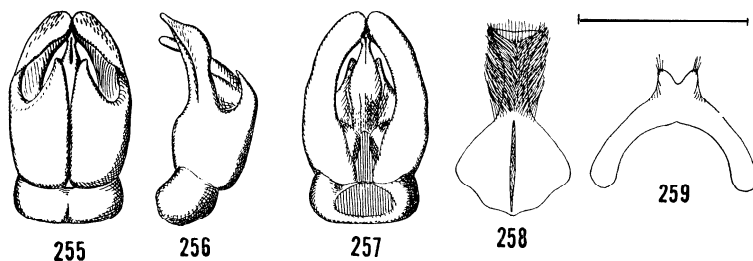
Female : Length about or slightly less than 9 mm.

Colour : Black ; mandibles reddened apically ; clypeus deep shiny black ; flagellum reddish brown beneath ; wings smoky with outer margins slightly darkened; veins brownish, stigma deep brown; tegulae brownish subhyaline or slightly reddish posteriorly, darkened apically ; legs piceous with tarsi and hind tibiae brownish; tibial spurs pale yellowish brown ; metasoma shiny black, with posterior margins of metasomal terga narrowly yellowish transparent.

Pubescence : Hairs on head short and scanty, primarily yellowish in fresh specimens ; hairs on clypeus very sparse, fine; facial fovea with hairs rather sparse, yellowish, not conspicuous ; hairs on mesoscutum dense, very short, rather shorn, ochreous; hairs on scutellum and metanotum long, concolorous with those on mesoscutum ; propodeum scanty of hairs dorsally; dorsal fringe of propodeal corbicula well developed with long, dense, branched, yellowish hairs; interior of corbicula with coarse, simple, silvery hairs anteriorly; hairs on mesopleuron sparse, not long, pale; hairs on legs pale to yellowish; trochanteral floccus perfect, long, well curled, whitish; femoral floccus long, dense, slightly yellowish; tibial scopa compact, composed of moderately long, soft, rather fine, simple hairs; tibial scopa sooty golden, fuscous above basally; metasoma scanty of hairs ; cilia on terga inconspicuous, yellowish; caudal fimbria nearly sooty golden or bright yellowish brown, slightly more brownish medially; posterior margin of 2nd tergum with lateral, that of 3rd with more broad and that of 4th with complete, narrow bands of short, appressed, yellowish hairs.

Structure : Head moderate in size, more or less circular in front view ; mandibles moderately long and stout; malar space almost obsolescent ; process of labrum large, thick, reflected and triangularly emarginate apically ; clypeus well convex, smooth, scattered with coarse punctures; clypeus slightly exceeding line running bases of eyes, its index about 1.8 : 1.1; facial quadrangle longer than broad (about 7.3 : 5.8); lower paraocular areas shiny, punctate nearly as in clypeus; facial fovea with lower half narrow and deeply impressed, upper half slightly widened but not sharply indicated, separated from eye margin by a punctate space; frons longitudinally strongly striate, with an indication of weak punctures; antennae with 3rd segment about as long as 4th plus 5th ; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance about 1.5 : 1.4 : 2.6 : 3.7 ; cheeks slightly narrower than eyes seen in profile, rounded

posteriorly, tessellate with more or less weak punctures. Mesoscutum dull, tessellate, very closely and rather finely punctate with punctures more or less roughened anteriorly; scutellum shiny, closely punctate with punctures a little stronger than those on mesoscutum; propodeum with lateral margins distinctly approximated posteriorly, with dorsal face dull, weakly nearly shagreened, not roughened; enclosure of propodeum large, triangular, well indicated, rugose more than basal half, almost granulate elsewhere; mesopleuron densely tessellate with roughened, more or less shallow punctures. Wings with 2nd submarginal cell receiving 1st recurrent vein slightly beyond middle of cell; basal vein slightly distad of nervulus. Legs with mid basitarsi hardly expanded medially, subequal to hind basitarsi in width; tibial spurs normal. Metasoma oblong, nearly polished and highly shiny; 1st tergum with more or less sparse, microscopical fine punctures; 2nd and following terga with slightly more dense, still fine punctures; posterior depressions of terga not well indicated.



Figs. 255-259. Genitalia and associated structures of *Andrena amamiensis* Hirashima. 255: dorsal view of genitalia, 256: lateral view of the same; 257: ventral view of the same, 258: 8th sternum, 259: 7th sternum.

Male: Length about or less than 7 mm.

Colour: Black; mandibles piceous, reddened apically; clypeus pale yellow medially; flagellum reddish brown beneath; wings smoky with distal margins slightly darkened; veins brown, stigma more darkened; tegulae brownish subhyaline; legs brownish; metasoma shiny black or piceous basally, with posterior margins of metasomal terga rather broadly yellowish transparent.

Pubescence: Hairs on head rather short, scanty, whitish or pale; hairs on thorax more or less long, rather sparse, yellowish above, white below; head and thorax without blackened hairs; hairs on legs pale to ferruginous; metasoma scanty of hairs; 1st and following terga with fringe-like, sparse, yellowish hairs laterally; hairs on 6th tergum brownish, bright.

Structure: Head large, much broader than thorax seen from above, thick; mandibles long, stout, curved, with sharp falciform apices; malar space almost linear medially, widened posteriorly; process of labrum bituberculate; clypeus transverse, strongly convex medially, smooth and weakly punctate; clypeus hardly exceeding line running bases of eyes, its index about 1.8 : 0.2; lower paraocular areas shiny, slightly more coarsely sculptured than clypeus; antennae rather elongate with 3rd segment a little more than one and one-half time as long as broad; 4th antennal segment about as long as wide, 5th and following segments

distinctly longer than wide ; vertex arched in front view, rather shiny, weakly tessellate and punctate ; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance about 1.4 : 1.8 : 2.9 : 4.2 ; cheeks well developed, much broader than eyes seen in profile, angulate medio-posteriorly, smooth and scattered with very weak punctures; outline of cheeks hardly convergent behind seen from above. Mesoscutum tessellate, scattered with weak punctures ; scutellum slightly convex, tessellate with weak punctures ; propodeum dull, narrowed posteriorly, densely tessellate, with an indication of obscure punctures, not roughened; enclosure more or less well indicated, rugose basally to rugulose apically, more coarsely sculptured than dorsal face of propodeum; mesopleuron tessellate with an indication of weak punctures. Wings an in female. Legs slender, as usual. Metasoma polished and highly shiny, sparsely acupunctate; posterior depressions of terga hardly indicated. Genitalia and subgenital sterna as illustrated.

Distribution : Japan (Amami-Oshima).

Specimens examined: 5 males, Shinmura, 4-5. iv. 1956 (S. Miyamoto); 2 males and 11 females, Amami-Oshima, 4. iv. 1958 (M. Takahashi).

Flower record: *Deutzia crenata* Sieb. et Zucc. for the female.

14. Subgenus ***Parandrena*** Robertson

Parandrena Robertson, 1897, Trans. Acad. S. Louis, 7:337; Cockerell, 1897, Canad. Ent., 29: 287 ; Lanham, 1949, Univ. Calif. Pub. Ent., 8: 202; Hirashima, 1952, Mushi, 24: 60.

Type-species : *Panurgus andrenoides* Cresson, 1878. (By designation of Cockerell, 1897.)

Diagnosis: The subgenus is characterized in having two submarginal cells in the fore wings. There are four subgenera of such a form in the world. They are separated by the following key.

1. Enclosure of propodeum with strong, more or less longitudinal rugae, declivity abrupt, bounded by a transverse carina; propodeal corbicula not well developed, no fringe of hairs anteriorly, interior with simple hairs throughout; *Trachandrena*-like species, male with clypeus black^u
 *Biareolina* (Old World)
 Enclosure of propodeum not carinate at declivity^{*} 2
2. Propodeum outside enclosure distinctly punctate ; lower ends of paraocular areas and at least part of clypeus yellow in female, and clypeus and lower ends of paraocular areas yellow in male; pterostigma slender
 *Callandrena* (New World)
 Propodeum outside enclosure not punctate ; pterostigma normal 3
3. Integument black or ferruginous in part; males with clypeus yellow or white; females with propodeal corbicula well developed, with a complete fringe of long compound hairs anteriorly *Parandrena* (New and Old Worlds)
 Integument metallic blue or green; male with clypeus concolorous with the rest of integument, rarely yellow; females with propodeal corbicula at most only moderately well developed, no fringe of hairs anteriorly, interior hairy throughout *Diandrena* (New World)

Parandrena is essentially an American. It is represented by eleven species there. According to Lanham (1949), it is found throughout the United States, but the subgenus is better represented in the Western States. It is of particular interest, from the standpoint of the geographical distribution of the insects, to record a species of *Parandrena* from Japan. The subgenus is not found in the Old World outside Japan.

The following description of the subgenus is based upon *Andrena yasumatsui* Hirashima for the female, whereas that of the male is of Lanham (1949), because the male of *yasumatsui* has not yet been discovered.

Female: Medium-sized species, integument black and ferruginous ; head slightly transverse in front view ; inner eye margin subparallel; process of labrum small, triangular; malar space almost obsolescent; clypeus bare, shiny, weakly punctate; antennae with 3rd segment about as long as 4th plus 5th; facial fovea rather deeply impressed, separated from eye margin by a more or less wide space, with upper end occupying more than one-half of distance between eye and post ocellus ; thorax without black pubescence ; enclosure of propodeum not coarsely sculptured ; propodeum outside enclosure densely tessellate or nearly finely granulate, without an indication of punctures; propodeal corbicula well developed, with a complete fringe of hairs anteriorly; trochanteral floccus perfect, considerably well developed; tibial scopa compact, composed of obscurely branched, more or less coarse hairs; mid basitarsi slender ; posterior spur of hind tibia normal; metasoma scanty of hairs, without fringe of hairs on posterior margins of metasomal terga ; terga finely punctate, with posterior depressions well indicated.

Male: “ Facial quadrangle conspicuously broader than long ; antenna with segment 3 longer than 4 ; mandibles long; decussate ; cheeks conspicuously broader than eye. Genitalia with parapenial lobes rather strongly produced, rounded ; aedeagus moderately expanded basally, sides not excavated.” (Lanham, 1949).

(51) *Andrena* (*Parandrena*) *yasumatsui* Hirashima

Andrena (*Parandrena*) *yasumatsui* Hirashima, 1952, Mushi, 24 (10) : 59.

Distribution: Japan (Honshu).

Specimens examined : 1 female, Mihama-machi, Chita-gun, Aichi Pref., 28. iii. 1958 (K.Ito); 1 female, on the flower of *Prunus*, Mori, Koshoku City, Nagano, 19-20, iv. 1961 (Y. Maeta).

Flower record : *Prunus salicina* Lindl.

15. Subgenus *Plastandrena* Hedicke

Plastandrena Hedicke, 1933, Mitt. 2001. Mus. Berlin, 19 : 217 ; Hirashima, 1952, Mushi, 24 : 63 ; Popov, 1949, Ent. Obozr., 30 : 389; Popov, 1958, Horae Soc. ent. Uni. Sovet., 46: 127.

Type-species : *Melitta tibialis* Kirby, 1802.

Diagnosis: So far as the type species is concerned, *Plastandrena* is closely related to *Glyphandrena*, and can only be separable from the latter by the absence of the black hairs on the thorax and the enclosure of the propodeum slightly

less coarsely sculptured with or without a bounding carina (although weak) posteriorly. The male genital structures of them are so close each other that they are hardly distinguishable. The facial fovea of the female is hardly separated from the eye margin in *Plastandrena*, whereas it is separated by a narrow punctate space in *Glyphandrena*.

So far as my study goes, *Plastandrena* is represented only a single species in Japan.

Description: Large species, integument black, occasionally metasoma reddened and tibiae and tarsi, especially hind ones, reddish brown or ferruginous. Head moderate in size; process of labrum rather small, flat, with apical margin nearly entire or a little emarginate; malar space well indicated; inner margins of eyes subparallel; facial quadrangle longer than broad; thorax without black pubescence; enclosure of propodeum well indicated, wrinkled all over, with or without a bounding carina posteriorly; dorsal face of propodeum as well as mesopleuron coarsely sculptured, especially so in male, but not so strongly roughened as in *Glyphandrena* in female; fore wings with three submarginal cell; metasoma not specially punctate, with posterior depressions of terga sharply indicated.

Female: Facial fovea wide, barely separated from eye margin by a very narrow punctate space; antennae with 3rd segment longer than 4th plus 5th; dorsal fringe of propodeal corbicula long, dense, slightly more developed than in *Glyphandrena*; interior of corbicula with sparse, rather fine, simple hairs; interior of corbicula occasionally with sparse, branched hairs anteriorly; trochanteral floccus nearly perfect, long and dense; tibial scopa compact, composed of moderately long, dense, primarily simple hairs; mid basitarsi slightly expanded medially, subequal to hind basitarsi in width; posterior spur of hind tibia widened and curved near base; posterior depressions of metasomal terga with sparse hair **fringes**.

Male: Clypeus black; mandibles moderately long; 3rd antennal segment approximately as long as broad, about as long as or shorter than next segment; cheeks not well developed; genitalia large, approximately as in *Glyphandrena*.

(52) *Andrena (Plastandrena) astragalina* Hirashima

Andrena (Plastandrena) astragalina Hirashima, 1957, Mushi, 30: 51, female and male.

This species is a close relative of *Andrena tibialis* Kirby of Europe and the only representative of the subgenus *Plastandrena* in our region.

This species is known only from Hokkaido and Kyushu at the present time, and the distribution of it is very local. According to my observations in 1958–59, it appears early in spring and has one generation in a year. Females of this species primarily associate with the flowers of **Brassica** and *Astragalus*.

The following redescription is based upon the holo- and allotypes respectively.

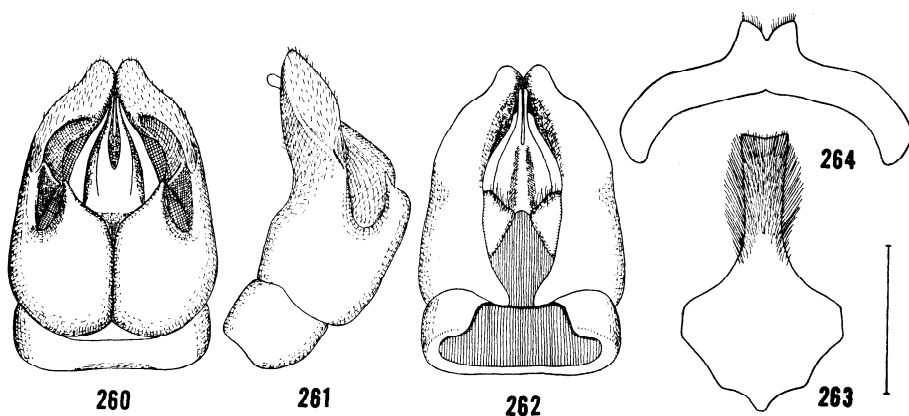
Female: Length 13 mm.

Colour: Black; mandibles broadly reddened apically; basal tubercles of mandibles reddened; flagellum beneath brown; wings slightly yellowish subhyaline with distal margins slightly darkened; veins and stigma nearly yellowish brown or partly more brownish; tegulae deep reddish brown posteriorly, blackish anteriorly; legs nearly piceous; mid tibiae and tarsi more reddened; hind tibiae

and tarsi ferruginous; tibial spurs pale ferruginous; posterior margins of metasomal terga obscurely reddened.

Pubescence: Hairs on head and thorax rather dense, not specially long, distinctly shorter than in *tibialis*; hairs on face, including clypeus, more or less dense, dull white; hairs on frons, vertex and cheeks above brownish; hairs on cheeks and occiput longer than those on clypeus, dull white; hairs on head much paler than in *tibialis* hairs on mesoscutum, scutellum and metanotum rather short, rather sparse at centre of mesoscutum, pale yellowish brown, much paler than in *tibialis*; hairs on propodeum and mesopleuron pale to dull white; dorsal fringe of propodeal corbicula not specially long, not specially well arranged in a compact fringe; hairs on outer faces of tibiae and basitarsi of fore and mid legs glistening, slightly brownish, much paler than in *tibialis*; trochanteral floccus large, compact, silvery or faintly yellowish, narrowly brown above basally; hairs on metasoma much sparser and shorter than in *tibialis*; hairs on 1st metasomal tergum fine, long, rather sparse, white; hairs on 2nd much shorter, white; cilia on 3rd and 4th white, nearly bare medially; posterior margin of 2nd with lateral, that of 3rd with more broad, that of 4th with more broad or nearly contiguous, white fringes of short, not specially dense, nearly appressed hairs; on the contrary, these hair fringes inconspicuous, composed of longer, not appressed, more dull hairs on *tibialis*; fimbria glistening brown.

Structure: Head moderate in size; mandibles moderately long, stout, malar space evident, about one-fourth as long as base of mandible, slightly widened posteriorly; process of labrum not specially large, nearly trapezoid, nearly entire at apex, clypeus well convex, densely and strongly punctate with punctures sparser and interspaces much more shiny than in *tibialis*; clypeus slightly exceeding line running bases of eyes, its index 3 : 1.5; facial fovea only slightly longer than broad (10 : 9.2); antennae with 3rd segment a little longer than 4th plus 5th; cheeks broader than eyes seen in profile, rather receding, nearly tessellate-punctate. Mesoscutum densely tessellate anteriorly, nearly smooth medi-



Figs. 260-264. Genitalia and associated structures of male *Andrena* (*Plastandrena*) *astragalina* Hirashima. 260: dorsal view of genitalia, 261: lateral view of the same, 262: ventral view of the same, 263: 8th sternum, 264: 7th sternum.

ally, more or less strongly punctate with punctures irregular in distribution; scutellum nearly flat, somewhat shiny, irregularly punctate; propodeum strongly roughened, nearly dull; enclosure defined by a more or less distinct carina which bounds apex of enclosure as well, feebly shiny, finely nearly rugulose, and sparsely and irregularly wrinkled; mesopleuron quite coarsely sculptured, much more roughened than in propodeum. Wings with 2nd submarginal cell receiving 1st recurrent vein slightly beyond middle of cell; basal vein interstitial with nervulus. Legs with mid basitarsi obscurely expanded medially, subequal to hind basitarsi in width; hind tibiae rather slender, a little wider than hind basitarsi; posterior spurs of hind tibiae widened basally. Metasomal terga smooth, distinctly shiny (more shiny than in *tibialis*), quite weakly and sparsely punctate with punctures weaker and sparser than in *tibialis*; intermediate terga with somewhat coarse longitudinal rugae; posterior depressions of intermediate terga broad, more or less sharply indicated, much less so than in *tibidis*, quite feebly punctate.

Male: Length 11.5 mm.

Colour: Black; mandibles reddened apically; basal tubercles of mandibles slightly reddened; flagellum brown beneath; wings, including veins and stigma, more paler than in female; tegulae reddish brown posteriorly, blackish anteriorly; legs piceous; tibiae and basitarsi, especially hind ones, reddened; small segments of tarsi nearly reddish brown; posterior margins of metasomal terga reddish brown to yellowish subhyaline.

Pubescence: Hairs on head and thorax rather long, more or less abundant, much paler than in *tibialis*, those on metasoma scanty; hairs on head nearly dull white except for brown hairs on sides of face, frons, and cheeks above; hairs on thorax uniformly pale, without admixture of brownish ones; hairs on legs pale to yellowish; hairs on metasomal terga much sparser and shorter than in *tibialis*, pale to slightly yellowish, without admixture of brown hairs; posterior margins of intermediate metasomal terga without distinct hair fringes.

Structure: Head moderate in size, broader than long seen in front; mandibles moderately long, more or less stout; malar space evident, about one-fourth as long as base of mandible; process of labrum transverse, slightly reflected apically; clypeus well convex, more shiny than in *tibialis*, clypeus slightly exceeding line running bases of eyes, its index about 2.4 : 1.2; facial quadrangle a little longer than broad (8.3 : 7.3); antennae elongate, 3rd segment approximately one and one-half times as long as broad, slightly shorter than 4th which is subequal to next segment; spaces between eye and post ocelli deeply concave; ratio of ocellular distance is 1.5 : 2 : 4 : 5.5; cheeks slightly broader than eye seen in profile, much more receding than in *tibidis*, nearly rugulose posteriorly. Mesoscutum tessellate, weakly so medially, rather strongly punctate with punctures irregular in distribution, much larger than those on clypeus; scutellum weakly convex, irregularly punctate; propodeum strongly roughened, nearly dull; enclosure defined by a weak carina, irregularly wrinkled; mesopleuron more coarsely sculptured than in propodeum. Wings nearly as in female. Legs slender, without special modification. Metasomal terga nearly smooth, shiny, feebly and sparsely punctate; metasomal terga smoother, therefore more shiny and less punctate than in *tibialis*; posterior depressions of terga well indicated. Genitalia and subgenital sterna as illustrated.

Specimens examined: from *Kyushu*: 2 males and 3 females, Kashii, Fukuoka, 5. iv. 1958 (Y. Hirashima); 1 female and 5 males, same locality as above, 18. iii.

1959 (Y. Hirashima); from *Hokkaido*: 1 female, Sapporo, 31. v. 1916 (S. Matsu-mura).

Distribu tion: Japan (Hokkaido and Kyushu).

Biology : The biology of this species is presented elsewhere in this paper.

Flower records: Females have been collected on the flowers of *Brassica campestris* and *Astragalus sinicus*.