

Systematic and biological studies of the family
Andrenidae of Japan (Hymenoptera, Apoidea).
Part 2. Systematics, 1

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Part 2. Systematics, 1*

Yoshihiro HIRASHIMA

Family ANDRENIDAE

Michener (1944) divided the family Andrenidae into three subfamilies. They are Andreninae, Panurginae and Oxaeinae. The latter subfamily is found in the Neotropical Region as far north as the southwestern United States, and the rest is holarctic in distribution.

On the other hand, Bernard (1955), in *Traité de Zoologie*, divided the family Andrenidae into three groups. They are Andreninae, Panurginae and Nomadinae. He used the term *tribu* for the group name of each of them. Shortly after, Sustera (1958) proposed a system to the classification of bees of the Old World. According to Sustera, however, the family Andrenidae is represented by four subfamilies, i. e., Andreninae, Panurginae, Nomadinae and Melitturginae. The subfamily Nomadinae of Sustera is represented by the tribes Pasitini (genus *Pasites*), Ammobatini (genera *Ammobates* and *Parammobatodes*) and Nomadini (genus *Nomada*). According to Michener, genera *Ammobates*, *Parammobatodes* and *Pasites* are included in the tribe Ammobatini of the subfamily Anthophorinae, and the genus *Nomada* is one of the genera in the tribe Nomadini of Anthophorinae (the family Apidae). The subfamily Melitturginae of Sustera is what is considered to be the tribe Melitturgini of the subfamily Panurginae of Michener. As can be seen, there is a fundamental difference between them.

So far as the genus *Nomada* is concerned, Michener's treatment of it seems to be reasonable to me, so that I have adopted the classification of Michener in this paper.

The family Andrenidae is best characterized by the presence of the defined subantennal areas which are defined by two subantennal

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sutures beneath each antennal socket. According to Michener (1944), "these are most conspicuous in species with extensive yellow facial markings in which the sutures stand out as black lines." In Japanese species, however, it is often necessary to scrape away a little hair below the antennae in order to see the rather feeble sutures. Of course, the subantennal areas are absent in the genus *Nomada*.

Since Andrenidae is represented by only two genera, i. e., *Andrena* and *Panurginus* which belongs to the independent subfamily respectively, in Japan, no attempt will be made to describe the family.

Key to the subfamilies of Andrenidae of Japan

1. Marginal cell with apex pointed on costal margin of wing or very narrowly rounded; females with pollen-collecting apparatus developed both on propodeum and hind legs Andreninae
 Marginal cell truncated at apex; females with pollen-collecting apparatus pertaining to hind legs alone; facial fovea, when present, much smaller than in Andreninae, not clothed with fine hairs
 Panurginae

Subfamily Andreninae

The subfamily is represented by the great genus *Andrena*, and by two small genera of the American *Ancylandrena* and *Megandrena*. According to Sustera (1958), an African *Didonia* Gribodo, which is represented by a single species, *Didonia punica* Gribodo, is one of the genera of the subfamily. Bernard (1955) considered *Biareolina* as a genus of the *tribu* Andreninae. According to the current practice, however, it would be better to treat it as a subgenus of *Andrena*.

The genus *Andrena* is primarily holarctic. It is one of the most abundant genera of bees, both in species and individuals. For example, more than forty subgenera have been proposed from both hemisphere. In the Old World, the genus is divided into at least twenty six subgenera but the classification of it is still unsatisfactory. In this paper, four new subgenera from Japan will be added to our knowledge.

The recognition of the species of *Andrena* is rather easy for the Melittologists who are familiar with the groups of genera, but it is frequently confused with some species of *Colletes* or *Melitta* even by one who is familiar with some of bees. *Andrena* is readily recognized by the presence of subantennal areas which are defined by two subantennal sutures. The subantennal suture is represented by one in *Colletes* or *Melitta*. The species of *Andrena* are further separated from those of *Melitta* by the longer jugal lobe of the posterior wing, the slender

distitarsi and the presence of the facial fovea. The facial fovea of the female of *Andrena* is very characteristic for the genus. It is large and usually covered with minute dense hairs giving a golden or brown sheen. *Colletes* is distinguished from *Andrena* by the characters such as the pitted horizontal area of the propodeum, the apically tapering metasoma, the first submarginal cell nearly as long as the next two cells together which are subequal in size, etc.

Species of *Andrena* serve as the host of *Nomada* and *Sphecodes* as well as the stylops. Although about fifty species of *Nomada* including many undescribed forms have been collected in Japan, our knowledge on the relationships of them to the particular species of *Andrena* is very scanty. The effect of the parasitism of the stylops is known as the *stylopization*. Although the stylopized specimens of *Andrena* have been frequently collected, no species of stylops parasitic on *Andrena* has been recorded from Japan.

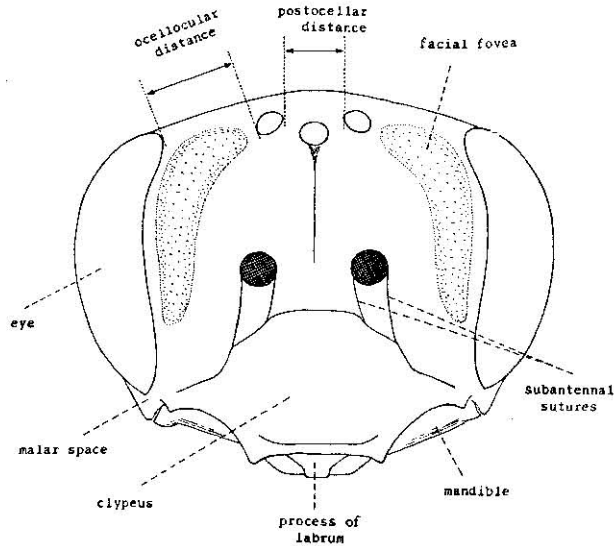


Fig. 23. *Andrena japonica* (Smith), female, head in front view.

Description of genus Andrena: Small to large species, integument black, black and red or metallic, male with clypeus black or yellow. Facial fovea large, densely covered with minute hairs in female, absent or undefined and not clothed with hairs in male; process of labrum present, variable in shape; mandibles bidentate; maxillary palpi six-segmented, usually distinctly exceeding tip of galea; in *Cnemidandrena*, maxillary palpi slightly reduced but at least as long as galea; labial palpi four-segmented, usually much shorter than maxillary palpi, or

rarely elongate; glossa usually short, acute; metanotum horizontal; propodeum at least as long as scutellum, usually gently slanting; propodeal enclosure usually well indicated; dorsal face of propodeum variable in sculpture, unusually it is punctate in *Calomelissa*, etc.; pleura usually granular in sculpture, or characteristically roughened with an

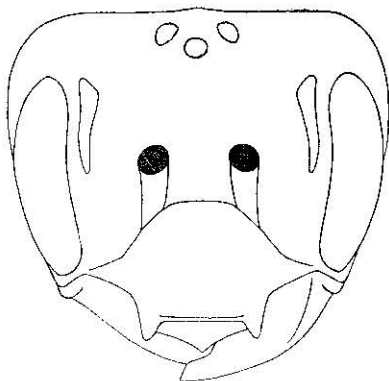


Fig. 24. *Panurginus crawfordi* Cocke-
rell, female, head in front view.

indication of close and strong punctures; fore wings with three, sometimes with two submarginal cells; second submarginal cell, if present, smaller than third; marginal cell longer than distance from apex of marginal cell to wing tip; jugal lobe of posterior wing nearly three-fourths as long as vannal lobe, or unusually slightly shorter in the type species of the subgenus *Charitandrena*; scopa extending from coxae to basitarsi of posterior legs and usually corbicula present on propodeum; basitibial plate present, conspicuous in female, weak

in female; pygidial plate present in female; male genitalia varies greatly in shapes of aedeagus, parameres and parapenial lobes; gonostyli of male genitalia absent.

Terminology

I have principally followed the terminology utilized by Charles D. Michener (1944) for description of the adult bees. The complementary notes on the terms which appear in the descriptions of the species as well as the subgenera are given below.

Facial fovea which is a characteristic feature of female *Andrena* is presented in the paraocular areas along the inner margins of the compound eyes. It is indicated by depressed space covered with fine, short, dense hairs. Unusually male of *Andrena* (*Gymnandrena*) *wulungshanensis* Yasumatsu has a pubescent fovea, and that of *Andrena* (?*Calomelissa*) *mitakensis* Hirashima has a weak depression near the eye. Facial fovea varies in width and length, the features may serve as either a subgeneric or specific.

Process of labrum is an appendix of the labrum. It provides a good character for the species as well as the subgenera. Extreme conditions are represented by a protuberant process as in the male of *Andrena* (*Cnemidandrena*) *seneciorum* Hirashima, and a large, semicircular process as in the female of *Andrena* (*Protomelissa*) *halictoides* Smith.

Malar space is the space between the lower end of the compound eye and the mandibular insertion. It varies in length but usually it is very short, then it is described as "obsolescent" or in extreme condition, as "linear." Usually *Protomelissa* has an elongate malar space, and in species of *Andrena* s. str., and *Hoplandrena*, it is of noticeable length, in which it is measured along the median line. Many males of *Hoplandrena* have a ventrally projecting spine on the malar space.

Clypeus, in the great majority of the species, is broadly convex and usually broader than long. Unusually it is flat in *Andrena* (*Calomelissa*) *prostomias* Pérez, or protuberant in *Andrena* (*Protomelissa*) *halictoides* Smith. The apical margin of the clypeus is usually not much exceeding below line running the bases of the compound eyes, but in species of *Andrena* s. str., it exceeds that line characteristically. The degree of it is indicated by the proportion of the distance from the base of the clypeus to the line running bases of the eyes and that from the latter to the apex of the clypeus. Then, the proportion is indicated by the term *index*.

Facial quadrangle is a space enclosed by the compound eyes and the vertex and the apical margin of the clypeus. The width of it is measured along the line running the antennal sockets. Facial quadrangle is usually longer than wide, unusually it is considerably elongate in *Protomelissa*.

Cheeks show only slight variation in shape in the female of *Andrena*. Males show great variation in width and outline of the cheeks, which are keeled posteriorly in some species of *Cnemidandrena* and *Notandrena*. The broad cheeks of the male is almost invariably correlated with the long mandibles.

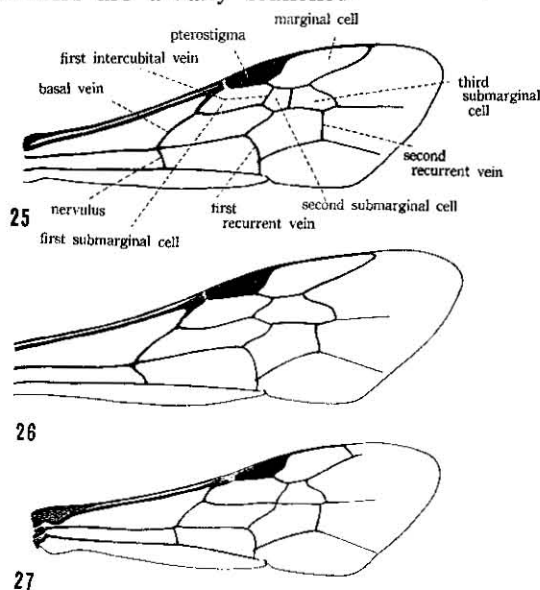
Mandibles show only little variation in the female, but they vary greatly in the male. Species of *Andrena* s. str. males have a ventrally projecting tooth near the base of the mandibles, or rarely lacking as in the male of *Andrena* (*Andrena*) *ishiharai* Hirashima.

Distance between post ocelli is termed as *postocellar distance*, that between post ocelli and the posterior margin of the vertex as *ocell-occipital distance*, and that between post ocellus and the compound eye as *ocellocular distance*. They show slight variations in proportion. The measurement of each length is made in the situation that it is placed horizontally.

Propodeal corbicula is the pollen-collecting apparatus which develops on the lateral portions of the propodeum. It is one of the characteristic features to the female of *Andrena*. When best developed, it forms a triangular pocket which is defined by a complete fringe of long curled hairs along the anterior margin of the propodeum and by another fringe along the lateral margin of the dorsal face of the propodeum. Such a corbicula is seen in the species of *Simandrena*, in

which the interior of the corbicula is free of hairs. Then it is expressed as "highly developed." The next degree of development is seen in the species of *Andrena* s. str., in which the interior is hairy. The common situation of the propodeal corbicula is that there is no fringe of hairs anteriorly and with simple hairs throughout on the interior. Such a condition is characteristic of *Gymandrena*, *Glyphandrena*, *Hoplandrena*, *Trachandrena*, etc.. Rather unusually, the propodeal corbicula is rudimental. In such a condition, the dorsal fringe is short and scanty, and the interior with short and fine hairs. Such a corbicula, characteristic to *Calomelissa* and *Charitandrena*, is incapable of carrying a mass of pollen load. On the contrary, the tibial scopa of such species is well developed.

Trochanteral floccus is a scopa which develops on the trochanter of the hind leg. It shows variations which, so far as I am aware, are noted at first by van der Vecht (1928). When best developed, all the hairs on the ventral margin of the trochanter are uniformly long, curled, and arranged in a compact bush. Such a condition is said to be "perfect." On the other hand, when the hairs on the basal half of the trochanter are considerably shorter than the rest and arranged into the brush, the floccus is named as "imperfect." The hairs on the hind trochanters are usually branched.



Figs. 25-27. Fore wings of *Andrena* and *Panurginus*.

Fig. 25: *Andrena japonica* (Smith).

Fig. 26: *Andrena* (*Parandrena*) *yasumatsui* Hirashima.

Fig. 27: *Panurginus crawfordi* Cockerell.

There is a considerable variation in the degree of the development of the *tibial scopa* which is composed of either simple or branched hairs on the hind tibia. The highly developed tibial scopa is characteristic to the species of *Chlorandrena* and *Chrysandrena*, and *Simandrena* have the tibial scopa very short.

Distitarsus together with each *mediotarsus* is, for the sake of convenience, frequently described as "small segments of tarsi."

The term pertaining to the venation of the fore wings are: 1st and 2nd *recurrent veins* represent veins 1st and 2nd m-cu respectively; *basal vein* is in accord with vein M and *nervulus* with vein cu-v; *first intercubital vein* means vein Rs. *Omogandrena* is unusual in having the second recurrent vein ends at the end of the third submarginal cell.

Male genitalia shows a considerable variation. *Parapenial lobe* which is a dorso-apical projection of the gonocoxite usually slightly to distinctly produced, but it is hardly so in some species, i. e., *Andrena* (*Simandrena*) *opacifovea* Hirashima, *Andrena* (*Poecilandrena*) *fukuokensis* Hirashima, etc. *Paramere* varies in the shape, slender or expanded apically. One of the most distinct characters seems to be the presence or absence of the lateral excavation of the *aedeagus*, which further shows the significant variation in the shape. The most interesting feature is that the presence of the dorsal keel or elevation of the *aedeagus* in the species of *Poecilandrena*.

Genus *Andrena* Fabricius

Key to the species of Japanese *Andrena* will be published at the end of this paper.

1. Subgenus *Andrena* Fabricius

Type-species: *Apis helvola* Linné, 1758. (By designation of Viereck, 1912.)

Diagnosis: The subgenus is rather easily recognizable by the combination of characters, such as the well-developed propodeal corbicula, the perfect trochanteral floccus, the usually abundantly hairy metasomal terga which lack definite hair bands in the female, and the large head, the falciform mandibles which usually have a ventral projection near the base and the broad and angled cheeks in the male.

The subgenus is widely distributed in both the New and Old Worlds.

Although descriptions of the subgenus *Andrena* have been given by Hedicke (1933), Lanham (1949), etc., the brief description of it, primarily based upon the Japanese species, is presented below.

Description: Rather small to large species, integument black for Japanese species; legs with hind tibiae and tarsi frequently obscurely to distinctly reddened. Head variable, slightly to distinctly broader than long; inner eye margin subparallel or sometimes slightly convergent above; process of labrum of female

usually slightly reflected and bilobed at apex except for *hondoica* sp. nov. in which it is rather distinctly convex apically, usually, transverse and convex in male except for *ishiharai* Hirashima in which it is reflected and deeply emarginate at tip, and for *hondoica* in which it is distinctly tapering toward apex where slightly roundly convex; malar space well indicated; thorax with or without black pubescence; enclosure of propodeum usually finely sculptured or rugose basally; dorsal face of propodeum as well as mesopleuron not coarsely sculptured, at most shagreened; wings with three submarginal cells; metasoma tessellate, usually impunctate, with posterior margins of metasomal terga not well indicated.

Female: Facial fovea wide, rather conspicuous; clypeus usually well convex, slightly to distinctly exceeding line running bases of eyes; facial quadrangle slightly to distinctly longer than broad; 3rd antennal segment as long as or a little longer than 4th plus 5th; propodeal corbicula well developed, with dorsal fringe of long, dense, well-arranged, branched hairs; interior of corbicula usually with branched hairs anteriorly, broadly free of hairs medially or with sparse, fine hairs nearly throughout; trochanteral floccus perfect, dense; tibial scopa usually compact, composed of long, well-arranged, simple hairs, or composed of long, not well arranged, rather coarse to coarse hairs in *mikado* Strand et Yasumatsu, *longitibialis* sp. nov. and *shirozui* sp. nov., or composed of short and fine hairs in *brevihirtiscopa* sp. nov.; mid basitarsi at most slightly expanded medially, subequal to hind basitarsi in width; tibial spurs normal; metasoma usually abundantly hairy, without definite hair bands, or occasionally hairs on metasoma scanty.

Male: Clypeus black; head large and much broader than thorax; mandibles long, falciform, with a ventral projection except for *ishiharai*; clypeus nearly flat to distinctly convex; 3rd antennal segment at least one and one half times as long as wide and much longer than 4th except for *natane* sp. nov. in which it is approximately as long as 4th and for *ishiharai* Hirashima in which it is slightly longer than broad and much shorter than 4th; cheeks usually much broader than eyes, usually distinctly angled behind. Genitalia with parapenial lobe elongate; aedeagus expanded basally, with sides deeply excavated.

(1) *Andrena (Andrena) brevihirtiscopa* sp. nov.

The female of this species can easily be separated from all other members of the subgenus by the scanty tibial scopa which is composed of short and fine hairs. The hind tibiae are slightly inflated and widened apically, the anterior margins slightly emarginate and with the outer surfaces not all obscured by the scopa. Thus, the characters of the hind tibia and tibial scopa are very like to those of *Simandrena*. The middle basitarsi are broadened medially and broader than hind basitarsi which are elongate, broadest subbasally and tapering toward apices. This is also characteristic for this species. The male of this species closely resembles that of *esakii*, but is readily distinguished from it by the flat clypeus and the characters of the genitalia and subgenital sterna. I cannot refer this species to any related ones.

A short series of males and females has been collected from Kyushu, northern Honshu and Hokkaido, suggesting the occurrence of this species in Shikoku. Almost all the specimens have been collected in May.

Female: Length 10-11 mm.

Colour: Black; mandibles reddened apically; flagellum beneath distinctly brownish; wings smoky, distal margins slightly darkened; veins and stigma yellowish brown; tegulae brownish subhyaline posteriorly, deeper brown anteriorly; legs piceous, mid basitarsi and hind tibiae and basitarsi distinctly brownish; tibial spurs pale; posterior margins of metasomal terga brownish.

Pubescence: Hairs on body not specially long and dense, not obscure integument; hairs on head whitish, mixed with sparse fuscous ones on sides of face, vertex, and cheeks near eyes; facial fovea chocolate; hairs on thorax pale yellowish brown above, pale below; propodeal corbicula with dorsal fringe composed of very long, dense, curled, pale hairs; interior of corbicula sparsely hairy anteriorly, broadly free of hairs posteriorly; legs without blackened hairs; trochanteral floccus long, whitish; femoral floccus silvery, dense tibial scopa whitish, scanty, hairs on anterior margin more or less long and coarse, curled, those on outer face very fine, simple, rather short to short, much shorter than width of tibia near apex, those on dorsal margin obscurely branched, much shorter than width of tibia; hairs on hind tibia not obscure integument; metasoma not specially hairy; hairs on 1st and base of 2nd terga long, pale, those of following terga short, paler, slightly denser on posterior margins, without admixture of darkened ones; caudal fimbria bright, nearly fulvous or slightly brownish.

Structure: Head of moderate size; mandibles moderately long and stout; malar space rather narrow, about one-fourth as long as base of mandible; clypeus rather well convex, densely tessellate, rather weakly and sparsely punctate except for medio-anterior portion where nearly smooth, shiny, and sparsely punctate; clypeus slightly exceeding line running bases of eyes, its index about 2:1.3; facial fovea slightly longer than broad (about 8.3:7.5); antennae moderately long, 3rd segment indistinctly longer than next two segments together; ratio of post-ocellar width to ocellocipital distance to postocellar distance to ocellocular distance is 1.5:1.6:3.2:5; cheeks slightly broader than eyes seen in profile, rather receding, tessellate, indistinctly punctate near eyes, feebly shiny. Mesoscutum densely tessellate, dull, with an indication of weak punctures; scutellum tessellate, nearly smooth apically, weakly punctate; propodeum with lateral margins rather distinctly convergent posteriorly, roughened, dull; enclosure large, finely sculptured; mesopleuron nearly as in propodeum or a little less coarsely sculptured. Wings with 2nd submarginal cell receiving 1st recurrent vein beyond middle or near end of cell; basal vein interstitial or distad of nervulus. Legs with mid basitarsi expanded medially, slightly broader than hind basitarsi which are elongate and tapering toward apices; hind tibiae slightly inflated and widened near apex with apical margin emarginate. Metasomal terga tessellate and nearly impunctate including posterior depressions, which are broad and sharply indicated.

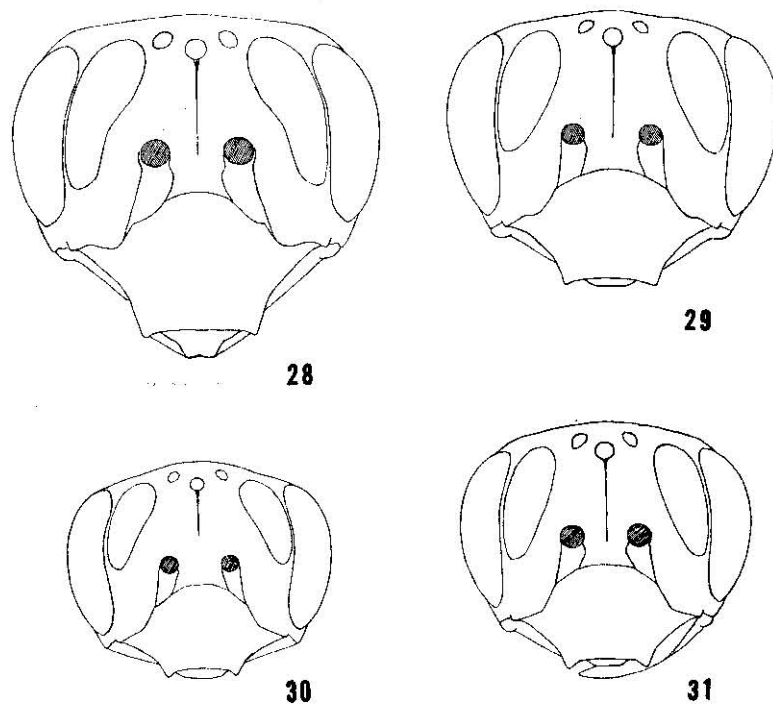
Male: Length about 8 mm.

Colour: Black; mandibles red apically; flagellum distinctly brownish beneath; wings and tegulae a little paler than in female; legs piceous or more paler; metasoma piceous, posterior margins of terga pale yellowish brown hyaline.

Pubescence: Hairs on head, thorax, and 1st metasomal tergum long, not specially dense, dull, pale and fuscous; hairs on clypeus, supraclypeal region, occiput and cheeks dull white, those on the rest of head fuscous; hairs on thorax pale above and more paler below, mixed with fuscous ones on mesoscutum and scutellum, and sometimes further on lateral bases of propodeum and mesopleuron; hairs on legs pale; hairs on metasoma pale, mixed with brownish one on 3rd to

5th terga; hairs on 6th tergum bright, yellowish.

Structure: Head large, much broader than thorax seen from above; mandibles long, curved, falciform, with sharp apices; basal projection of mandible rather large, subtriangular; malar space rather narrow, about one-fourth as long as base of mandible; process of labrum short, transverse, not specially roundly convex, smooth and shiny; clypeus scarcely convex, tessellate and densely punctate excepting medio-subapical portion where nearly smooth, broadly impunctate and shiny; clypeus only slightly exceeding line running bases of eyes, its index about 1.6:1; facial quadrangle only slightly longer than broad (about 7:6.5); antennae moderately long, 3rd segment about or a little less than twice as long as broad, longer than 4th which is less than one and one-half times as long as broad and a little shorter than 5th; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.5:1.6:3.3:5.2; cheeks elongate and angulate posteriorly, less than one and one-half times as broad as eyes seen in profile, tessellate, sparsely punctate and feebly shiny. Mesoscutum densely tessellate, weakly and sparsely punctate, dull; scutellum tessellate, less coarsely sculptured or sometimes nearly smooth subbasally; propodeum roughened, dull; enclosure tessellate, rugulose basally; mesopleuron densely tessellate and some-



Figs. 28-31. Front view of female *Andrena* (*Andrena*).

Fig. 28: *mikado* Strand et Yasumatsu, fig. 29: *bombiformis* Yasumatsu et Hirashima, sp. nov., fig. 30: *brevihirtisopa* sp. nov., fig. 31: *maukensis* Matsumura.

what coarsely punctate, dull, a little more coarsely sculptured than in mesoscutum. Wings nearly as in female. Legs slender, without special modification. First metasomal tergum densely tessellate, 2nd and following terga less strongly so, becoming much smoother toward apical terga; posterior depressions broad, not sharply indicated. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Hokkaido, Honshu and Kyushu).

Type material: Holotype female, allotype male, Mt. Hikosan, Prov. Buzen, Kyushu, 1,000 m., 4. v. 1937 (K. Yasumatsu); 5 paratopotype males, same data as holotype (K. Yasumatsu); 3 paratopotype males and 1 paratopotype female, 6. v. 1951 (Y. Hirashima); 1 paratype male, Sukayu, Towada, Aomori Pref., 26. v. 1958 (R. Ishikawa); 1 paratype female, Towadayama, Aomori Pref. 27. v. 1958 (R. and F. Ishikawa); 1 paratype female, Ashorobuto, Ashoro-gun, Hokkaido, 24. v. 1957 (M. Takahashi); 1 paratype female same locality as above, 13. vi. 1957 (M. Takahashi); paratype females, Moiwa, Hokkaido, 21. v. 1905 (? S. Matsumura).

Type depositories: Holo-, allo- and 11 paratypes are preserved in the collection of the Entomological Laboratory, Kyushu University; 2 paratypes to the Entomological Laboratory, Hokkaido University; 2 paratypes to the collection of R. Ishikawa.

Flower record: Not available.

(2) *Andrena (Andrena) mikado* Strand et Yasumatsu

Andrena (Melandrena) mikado Strand et Yasumatsu, 1938, Mushi, 11:67, female (not for male).

Andrena mikado Yasumatsu, 1941, Peking Nat. Hist. Bull., 15: 278.

This is a largest one amongst the species of the subgenus *Andrena* of Japan and the recognition of it is easy. It has one generation in a year, and appears early in spring. It has been collected in the mountainous regions of Honshu, Shikoku, Kyushu and Yakushima.

It is of particular interest to note that there is a considerable variation in the colour of the pubescence. In a typical form, the pubescence is nearly all black except for fulvous hairs on the third to fifth metasomal terga. On the contrary, the pubescence of the thorax and metasoma is nearly all fulvous in a *forma A* which has frequently been collected. In a *forma B*, the intermediate form, the pubescence on the scutellum, metathorax and metasoma is nearly fulvous while the one on the rest of the body nearly all black. The variation of the colour of the pubescence appears, however, only in the female. The male has the pubescence of nearly gray and black.

Synonymy: Although this species has been described under the subgenus *Melandrena*, it is a good representative of *Andrena* s. str. The allotype of this species is recorded as the male in the original description. The examination of the specimen which is indicated as the allotype of *mikado* reveals, however, that it is not the true male of *mikado* but belongs to the female of *Andrena bombyformis* sp. nov.

Female: Length 13-15 mm.

Colour: Black; mandibles reddened apically; flagellum beneath indistinctly piceous; apices of metasomal terga narrowly and obscurely brownish; legs piceous, small segments of tarsi more reddish; tibial spurs reddish brown; wings slightly smoky, distal margins slightly darkened; veins and stigma reddish brown;

Pubescence: As mentioned above, hairs vary greatly in colour; in a typical

form, hairs on 4th and 5th or 3rd to 5th metasomal terga nearly uniformly fulvous while those on the rest of body all deep black; in *forma A*, hairs on head black and pale fulvous, those on thorax and metasoma fulvous, and those on legs black; in *forma B*, hairs on scutellum, metathorax and metasomal terga nearly uniformly fulvous while those on the rest of body black. Hairs on body, especially on thorax and all exposed metasomal terga, long and dense; tibial scopa large, composed of somewhat loose, coarse and simple hairs.

Structure: Head moderate in size; mandibles long and stout; malar space broad, approximately one-half as long as base of mandible, or about as broad as mid ocellus which is nearly circular; clypeus well convex, elongate, much exceeding line running bases of eyes, its index 1.8:3.6; clypeus densely punctate tessellate basally, smooth and sparsely punctured apically, with a trace of median, raised, impunctate line; facial quadrangle much longer than broad (about 9:12); ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 0.8:1:1.5:2.8; antennae long, with 3rd segment indistinctly longer than 4th and 5th combined, 4th and following segments longer than broad respectively; cheeks slightly broader than eyes seen in profile, weakly shiny and feebly punctate near eyes, tessellate and nearly dull posteriorly. Mesoscutum densely tessellate-punctate, dull; mesoscutum nearly as in mesoscutum; propodeum nearly roughened propodeal enclosure more or less well indicated, wrinkled about basal half; mesopleuron tessellate punctate, more roughened than in mesoscutum, nearly dull. Metasomal terga tessellate-punctate, weakly shiny; posterior depression of 2nd to 4th terga broad, not sharply indicated. Integuments of thorax and metasoma obscured by dense covering of hairs. Wings with 2nd submarginal cell receiving 1st recurrent vein beyond middle or near end of cell; basal vein interstitial or distad of nervulus.

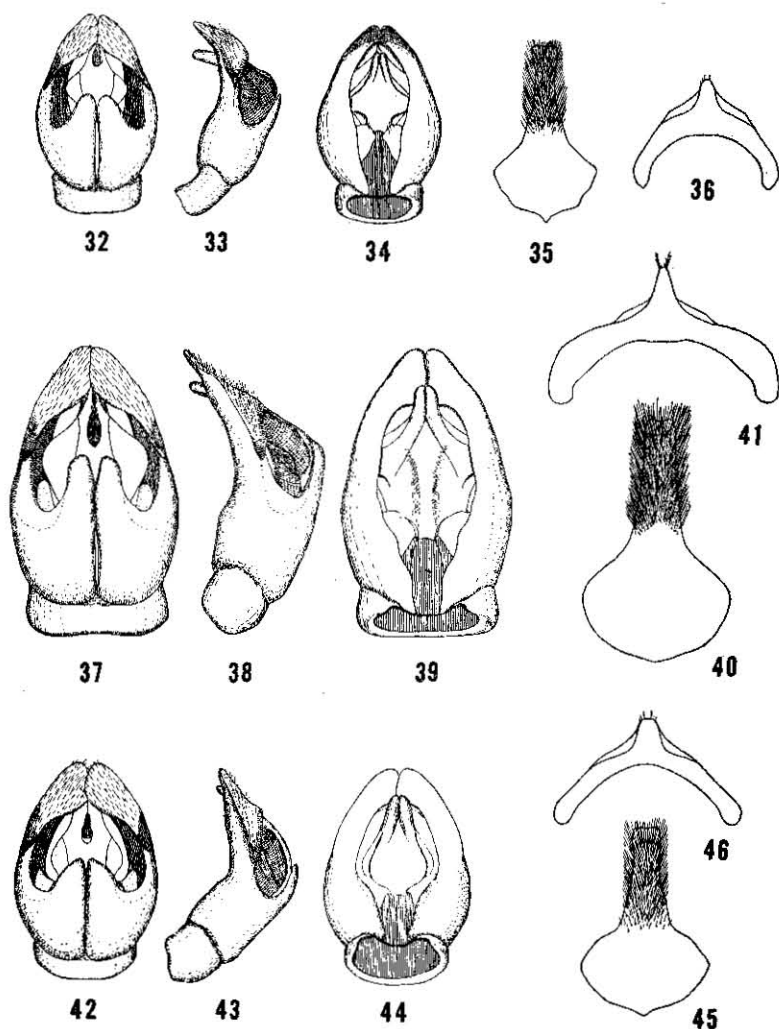
Male (New to science): Length 10-11 mm.

Colour: Black; mandibles reddened apically; flagellum beneath obscurely to sometimes distinctly brownish; apical portions of metasomal terga rather broadly reddish brown to pale brownish; legs more or less piceous basally to reddish brown apically; tibial spurs pale reddish brown; wings indistinctly paler than in female, veins and stigma reddish brown; tegulae deep brown to piceous.

Pubescence: Hairs on body either dull gray or black, much sparser than in female; hairs on clypeus, supraclypeal region, scape, occiput, cheeks below, thorax, basal two metasomal terga, coxae, trochanters, and femora long dull white; hairs on sides of face, cheeks above and near eyes, lateral base of propodeum long and black; hairs on 3rd to 5th metasomal terga much shorter than preceding terga, slightly yellowish, intermixed with blackish ones; hairs on 6th metasomal tergum long and yellowish; hairs on tibiae yellowish, those on inner sides of tibiae pale ferruginous.

Structure: Head large, much broader than thorax; mandibles long, curved, falciform, with sharp apices; basal projections of mandibles large, not sharply pointed at apices, malar space elongate, about one-half as long as base of mandible, or a little broader than longitudinal width of middle ocellus; malar space smooth and shiny; process of labrum large, roundly convex, shiny; clypeus weakly convex, nearly flat and sparsely punctate apically, elongate and much exceeding line running bases of eyes; facial quadrangle much longer than broad (about 12:8); ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 0.7:1:1.6:2.8; antennae long, with 3rd segment more

than twice as long as broad, longer than 4th (about 4.5:3.5), which is a little less than twice as long as broad, 4th and following segments slightly convex anteriorly; cheeks elongate posteriorly, about twice as broad as eyes seen in profile, distinctly angulate behind, its outlines gently tapering posteriorly seen from above. Meso-



Figs. 32-46. Genitalia and associated structures of male *Andrena* (*Andrena*).

Figs. 32-36: *brevihirtiscopa* sp. nov., 32: dorsal view of genitalia, 33: lateral view of the same, 34: ventral view of the same, 35: 8th sternite, 36: 7th sternite; figs. 37-41: *mikado* Strand et Yasumatsu, 37: dorsal view of genitalia, 38: lateral view of the same, 39: ventral view of the same, 40: 8th sternite, 41: 7th sternite; figs. 42-46: *ishiharai* Hirashima, 42: dorsal view of genitalia, 43: lateral view of the same, 44: ventral view of the same, 45: 8th sternite, 46: 7th sternite.

scutum densely tessellate, sparsely and indistinctly punctate, dull; scutellum nearly as in mesoscutum; propodeum roughened, dull; enclosure not well defined, sculptured nearly as in female, mesopleuron slightly less coarsely sculptured than in propodeum, dull. Wings nearly as in female. Legs slender, without special modification. Metasomal terga tessellate, weakly and sparsely punctate; posterior marins of terga nearly smooth and shiny. Genitalia and subgenital sterna are as illustrated.

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

Specimens examined: from *Honshu*: 1 male, Tsuta, Towada, Aomori Pref., 28-30. v. 1958 (R. Ishikawa); 3 males and 2 females, Gaga, Mt. Zao, Miyagi Pref., 24-25. v. 1958 (R. Ishikawa); 2 males and 1 female, Nasu, Yumoto, 21-22. v. 1958 (R. Ishikawa); 1 female, Umagaeshi, Nikko, 7. v. 1950 (N. Fukuhara); 1 female, on flower of *Pieris japonica*, Mt. Bukka, Aiko-Co., Kanagawa Pref., 10. iv. 1956 (R. Ishikawa); 1 female, Ikenozizo, Yamanaka, Siga Pref., 2. iv. 1938 (T. Kimura); 1 male and 1 female, Rokko, Kobe, 5. iv. 1951 (T. Kifune); 1 female Abu-yama, Prov. Aki, 18. iv. 1937 (S. Miyamoto); 1 female, Yahata-mura, Saeki-gun, Hiroshima Pref., 31. iii 1938 (S. Miyamoto); from *Shikoku*: 1 male, Sugitate, Matsuyama, 1. iv. 1953 (T. Edashige); 1 male, Omogo, Prov. Iyo, 26. iv. 1953 (T. Edashige); from *Kyushu*: 1 male and 1 female, Mt. Hikosan, Prov. Buzen, 650-1,000 m., 18-19. iv. 1938 (K. Yasumatsu); 1 female, Mt. Hikosan, 6. v. 1951 (Y. Hirashima); 13 males and 18 females, on the flowers of *Pieris japonica*, Hokkein, Mt. Kuju, 10-11. iv. 1959 (Y. Miyatake); 2 females, Ohnamino-ike, Mt. Kirishima, 5. v. 1954 (S. Tani-guchi); from *Yakushima*: 1 male and 2 females, Kosugidani, 25. iv. 1929 (K. Takeuchi); 1 male, Kurio, 27. iv. 1929 (K. Takeuchi).

Flower record: Many males and females has been collected on the flowers of *Pieris japonica*.

Parasite: As recorded above, Mr. R. Miyatake collected a rather long series of males and female of this species at Hokkein, Mt. Kuju, and, at the same time, collected a short series of *Nomada calloptera* Cockerell, which probably seem to be a parasite of this species.

(3) *Andrena (Andrena) bombiformis* Yasumatsu et Hirashima, sp. nov.

Andrena (Melandrena) mikado Strand et Yasumatsu, 1938, male (not female).

As indicated above, what is designated as the allotype of *Andrena mikado* Strand et Yasumatsu belongs to the female of the present species. Unfortunately this new species is known only from the female. The female of *bombiformis* is readily recognizable by the presence of the abundant long black hairs on the head, thorax and basal metasomal terga. It resembles closely the typical black form of *mikado*, but is easily separated from it by the smaller size, the ferruginous tibiae and tarsi of the hind legs and paler tibial scopa. The pubescence of the metasoma varies in colour. Usually the black hairs present on the basal metasomal terga, but rarely the hairs on the metasoma all fulvous.

It is of interest to note that this species is structurally very close to *Andrena nawaii* Cockerell and once I considered that this is a black form of that species. However, the malar space of this species seems to a little more elongate and the hairs on the metasoma slightly more abundant.

So far as known, this species occurs in the mountainous or sub-mountainous

regions of Honshu and Kyushu. Specimens before me have been collected in April and May.

Female: Length 11-12 mm.

Colour: Black; mandibles reddened apically; flagellum beneath brownish or obscure reddish brown; wings slightly brownish subhyaline with distal margins darkened; veins and stigma yellowish brown or slightly more brownish; tegulae brownish or reddish brown; legs piceous with hind tibiae and tarsi ferruginous; tibial spurs yellowish brown; posterior margins of metasomal terga narrowly brownish or yellowish brown subhyaline.

Pubescence: Body densely covered with long hairs, which obscure integument; hairs on head, thorax and basal two or three metasomal terga black, those on apical terga, including caudal fimbria, fulvous; rarely hairs on metasoma nearly all fulvous; facial fovea blackish; hairs on clypeus sparse medially; dorsal fringe of propodeal corbicula long, dense; interior of corbicula with sparse, fine, fuscous hairs on fore and mid legs and coxae and trochanters of hind legs primarily fuscous; femoral floccus sooty yellowish brown; tibial scopa nearly fulvous or more yellowish, compact; hairs on hind basitarsi yellowish brown; hairs on metasomal terga primarily erect, becoming slightly downy near posterior margins of intermediate terga.

Structure: Head indistinctly narrower than thorax seen from above; mandibles rather long, moderately robust; malar space well developed, shiny, very feebly punctate, about one-third time as long as base of mandible; clypeus well convex, shiny, irregularly punctate, with a median, longitudinal, broad, raised, impunctate space; clypeus elongate, much exceeding line running bases of eyes, its index about 1.8:2.6; facial fovea rather short, very broad, not sharply indicated; antennae elongate, with 3rd segment about equal or a little longer than 4th plus 5th; facial quadrangle slightly longer than broad (about 10.4:8.7); ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.8:1.5:4:6.4; cheeks broader than eyes seen in profile, slightly reflected posteriorly. Mesoscutum and scutellum densely tessellate, dull; enclosure of propodeum more or less well indicated, finely tessellate or nearly finely granulate, rugose basally; propodeum outside enclosure shagreened; mesopleuron weakly shagreened with an indication of roughened punctures. Wings with 2nd submarginal cell receiving 1st recurrent vein near end of cell; basal vein slightly distad of nervulus. Legs with mid basitarsi subequal to hind basitarsi in width; tibial spurs normal. Metasoma condensed oval; metasomal terga densely tessellate, 1st tergum especially so and dull, following terga becoming slightly shiny toward apical terga.

Male: Unknown.

Distribution: Japan (Honshu and Kyushu).

Type material: Holotype female and paratopotype female, on flowers of *Rubus* sp., Okawachi-Yatate, Shiiba-mura, Prov. Hyuga, 10. iv. 1959 (Y. Hirashima); 2 paratype females, Hikosan, 650 m., Prov. Buzen, 23. iv. 1930 (K. Yasumatsu); paratype female, same locality as above, 950 m., 30. iv. 1938 (K. Yasumatsu); paratype female, same locality as above, 6. v. 1951 (Y. Hirashima); paratype female, same locality as above, 11. v. 1952 (Y. Hirashima).

Type depository: All the types are deposited in the collection of the Entomological Laboratory, Kyushu University.

Specimen examined other than type material: 1 female, Hiei, Honshu, 6. v. 1933

(T. Kimura).

Flower record: Rubus sp.

(4) *Andrena (Andrena) ishiharai* Hirashima

Andrena (Andrena) ishiharai Hirashima, 1953, Trans. Shikoku Ent. Soc., 3:33, female.

Andrena ishiharai Uéda, 1954, Trans. Shikoku Ent. Soc., 4:50.

This species is a moderate sized, robust bees and adorned with abundant black and fulvous hairs, which, however, are slightly sparser and shorter than in *Andrena nipponica* Cockerell. The mandibles of the male are not dentate basally and, therefore, the recognition of this species is easy.

According to the collecting data, this species has two generations in a year; it appears in May and September.

Female: Length less than 12 mm.

Colour: Black; mandibles reddened apically; flagellum beneath brownish; wings subhyaline, distal margins slightly darkened; veins and stigma pale brown; tegulae deep brown anteriorly, transparent pale ferruginous posteriorly; legs piceous, sometimes tibiae and tarsi more reddened; tibial spurs yellowish brown; posterior margins of metasomal terga reddish brown.

Pubescence: Hairs on head long, rather dense, nearly uniformly black except for dull fulvous ones on occiput; hairs on thorax long, dense, more or less obscure integument; fulvous above and fuscous below; hairs on legs fuscous or nearly black, including trochanteral floccus and tibial scopa, except for femoral floccus which is dull white in front; tibial scopa rather large, compact, composed of well arranged, rather coarse, simple hairs; hairs on 1st and 2nd metasomal terga long, those on 3rd and 4th short, pale fulvous; caudal fimbria fuscous; hairs on posterior margins of 2nd to 4th metasomal terga downy, appear to form an obscure hair band.

Structure: Head moderate in size; mandibles long and stout; malar space rather wide, about one-third times as long as base of mandible, or a little shorter than longitudinal width of mid ocellus; clypeus moderately convex, tessellate all over, nearly dull, densely punctate, with a trace of median, raised line; clypeus rather short, not much exceeding line running bases of eyes, its index about 2.2:1.8; antennae of moderate length, 3rd segment subequal to next two segments taken together; facial quadrangle slightly longer than broad (about 9.3:7.8); ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 2:2.3:3.9:6; cheeks broader than eye seen in profile, rather receding, densely punctate (with punctures small) near eyes, tessellate and sparsely punctate posteriorly. Mesoscutum densely tessellate-punctate, dull; scutellum nearly as in mesoscutum; propodeum roughened, dull; enclosure of propodeum ill defined, weakly wrinkled basally, mesopleuron nearly as coarse as propodeum or punctures a little sparser. Wings with 2nd submarginal cell receiving 1st recurrent vein near end of cell; basal vein nearly interstitial with or distinctly distad of nervulus. Metasomal terga tessellate-punctate, weakly shiny; posterior depressions of terga broad, not well indicated.

Male: (New to science): Length 9-10 mm.

Colour: Black; mandibles reddened apically; flagellum beneath brownish; wings a little paler than in female, veins and stigma brownish; tegulae brownish or pale ferruginous hyaline posteriorly, deep brown anteriorly; legs piceous,

tibiae and tarsi more reddened; tibial spurs pale ferruginous; posterior margins of metasomal terga reddish brown to yellowish brown.

Pubescence: Hairs on head long, rather dense, black on clypeus, sides of face, frons, and cheeks, and pale on middle part of clypeus, supraclypeal region, occiput and cheeks below; hairs on thorax long, rather dense, pale fulvous, intermixed with fuscous ones on underside of thorax or further on mesopleuron and lateral bases of propodeum; hairs on legs predominantly pale; hairs on 1st metasomal tergum and median portion of 2nd long, yellowish, those on 3rd and 4th short, pale and brownish, those on 5th a little longer, predominantly fuscous, those on following terga nearly bright fulvous medially.

Structure: Head not specially large, slightly broader than thorax seen from above; mandibles not specially long, falciform, with sharp apices, *without basal projection*; malar space rather wide, about one third time as long as base of mandible, or nearly equal to longitudinal width of mid ocellus; process of labrum small, deeply notched medially, slightly thickened apically, not roundly convex as in *Andrena nipponica*; clypeus only slightly convex, tessellate all over, densely punctured, dull or nearly so; clypeus short, slightly exceeding line running bases of eyes, its index 1.8:1.3; antennae elongate, 3rd segment slightly longer than wide, much shorter than the 4th which is twice as long as broad; ratio of post-ocellar width to ocelloccipital distance to postocellar distance to ocellular distance is 1.5:2:3.5:6; facial quadrangle a little longer than broad (about 8:7.3); cheeks elongate and angulate posteriorly, about one and one-half times as broad as eyes seen in profile, rather receding, tessellate-punctate nearly all over, with punctures smaller near eyes. Mesoscutum densely tessellate, especially so anteriorly, rather sparsely punctate with punctures round and shallow, dull; scutellum nearly as in mesoscutum; propodeum roughened, dull; enclosure of propodeum ill defined, wrinkled basally; mesopleuron a little less coarsely sculptured than in propodeum. Wings as in female. Legs slender, without special modification. Metasomal terga weakly tessellate, weakly and sparsely punctured, slightly shiny; posterior depressions of 2nd to 4th terga rather broad, not well indicated, nearly smooth or feebly tessellate. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Hokkaido, Honshu and Shikoku).

Specimens examined: from *Hokkaido*: 2 males, Ashorobuto, Ashoro-gun, 28-30. v. 1957 (M. Takahashi); 1 male, Osappe, Lake Kuccharo, 5. vi. 1957 (M. Takahashi); from *Honshu*: 2 males, Sukayu, Towada, Aomori Pref., 26. v. 1958 (R. Ishikawa); 1 female, Gaga, Mt. Zao, Miyagi Pref., 24-25. v. 1958 (R. Ishikawa); 1 male (allotype) and 1 female, Yumoto, Nikko, Tochigi Pref., 22-24. v. 1957 (R. Ishikawa); 1 female, Usui-toge, Nagano Pref., 14. ix. 1949 (R. Ishikawa).

Flower record: Unknown.

(5) *Andrena (Andrena) nawai* Cockerell

Anthrena japonica Alfken, 1900, Ent. Nachr., 26: 178, female.

Andrena simulans Pérez, 1905, Bull. Mus. d'Hist. Nat. Paris, 1905: 34, male; Cockerell, 1913, Ann. Mag. nat. Hist., (8) 11: 189, male.

Andrena nawai Cockerell, 1913, Ann. Mag. nat. Hist., (8) 11: 188, female; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15: 279.

Andrena simulatilis Viereck, 1918, Proc. biol. Soc. Washington, 31: 59.

Andrena nipponica Cockerell, 1922, Proc. U. S. Nat. Mus., 60: 11; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15: 279.

Andrena japonica Alfken, 1924, Konowia, 3:95, male.

This species is a moderate sized, robust and abundantly hairy bees. The recognition of it is easy owing to the dense fulvous hairs on the thorax and metasoma in the female, and to the fulvous hairs on the thorax in the male. The female of this species resembles that of the *forma A* of *Andrena mikado* Strand et Yasumatsu, but readily separated from it by the smaller size, the paler hairs on the legs, and the ferruginous tibiae and tarsi of the hind legs.

So far as known, this species occurs in Hokkaido and Honshu, and has not been found from Kyushu. This species flies early in spring, and probably passes a generation in a year.

Synonymy and homonymy: Alfken's species of *Anthrena japonica* is preoccupied by (*Nomia*) *Andrena japonica* (Smith), and, therefore, Cockerell (1922) elected *Andrena nipponica* for *Anthrena japonica* Alfken. On the other hand, Pérez (1905) described a new species from Japan, *Andrena simulans*, based upon the male. According to Viereck (1918), *Andrena simulans* Pérez, 1905, is a homonym of *Andrena simulans* Pérez, 1903, so that he elected *Andrena simulatilis* for the former. According to Alfken (1924), however, *Andrena simulans* Pérez, 1905, is a synonym of (*Anthrena*) *Andrena japonica* Alfken. Therefore, what Alfken described as *Anthrena japonica* has been recognized as *Andrena nipponica* Cockerell.

So far as my study goes, however, *Andrena nawai* Cockerell, 1913, is a synonym of *Anthrena japonica* Alfken, which is now named as *Andrena nipponica* Cockerell, 1922. It is apparent that *Andrena nawai* Cockerell published prior to *Andrena nipponica* Cockerell, so that *Andrena nawai* Cockerell is a valid name and should be used for *Anthrena japonica* Alfken.

Female: Length 11-12 mm.

Colour: Black; mandibles reddened apically; flagellum beneath brownish; posterior margins of metasomal terga narrowly brownish; legs piceous basally, becoming more reddish toward distitarsi; hind tibiae and tarsi, occasionally further mid tarsi dark to clear ferruginous; tibial spurs ferruginous; wings slightly smoky, distal margins slightly darkened; veins and stigma yellowish brown; tegulae brown.

Pubescence: Hairs on body rather long to long, abundant, well obscure integument; hairs on head sooty fulvous except for fuscous ones on sides of face, frons, vertex and cheeks above near eyes; occasionally brownish hairs present on clypeus; hairs on clypeus more dense than in *Andrena bombiformis* Hirashima; facial fovea blackish; hairs on thorax and metasoma uniformly fulvous, not mixed with brownish ones except for caudal fimbria which is occasionally slightly brownish hairs on metasomal terga erect to downy, forming a loose, obscure hair band on each posterior margin of 2nd to 4th terga; hairs on tibiae and tarsi of fore and mid legs primarily brownish to fuscous, those on the rest of legs fulvous or more yellowish; dorsal fringe of propodeal corbícula long, dense; interior of corbícula with sparse, fine hairs; tibial scopa compact, nearly sooty golden.

Structure: Head moderate in size; mandibles long and stout; malar space wide, about two-sevenths times as long as base of mandible, or slightly shorter than longitudinal width of mid ocellus; clypeus well convex, narrowly tessellate-punctate and dull basally, smooth and sparsely, somewhat strongly punctate elsewhere, with a trace of median, raised, impunctate line; clypeus much exceeding line running bases of eyes, its index about 2:2.3; facial quadrangle much

longer than broad (about 10.3:7.7); antennae long, with 3rd segment indistinctly longer than 4th and 5th together; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.8:1.8:3.8:6; cheeks approximately one and one-half times as broad as eye seen in profile, somewhat receding, nearly smooth and weakly punctate near eyes tessellate and dull elsewhere. Mesoscutum densely tessellate, with an indication of sparse, shallow punctures, dull; scutellum nearly as in mesoscutum; propodeum not strongly roughened; enclosure ill defined, weakly wrinkled basally; mesopleuron a little less roughened than in propodeum, dull. Wings with 2nd submarginal cell receiving 1st recurrent vein beyond middle or near end of cell, basall vein nearly interstitial with or distad of nervulus. Metasomal terga tessellate, weakly punctate, nearly dull; posterior depressions of 2nd to 4th terga broad, not well indicated.

Male: Length 8-10 mm.

Colour: Black; mandibles reddened apically; flagellum beneath brownish; wings and tegulae nearly as in female, legs piceous basally, reddened toward distitarsi, especially hind tibiae and tarsi distinctly reddened; metasoma occasionally piceous, posterior margins of terga brownish to yellowish brown.

Pubescence: Hairs on head long, fulvous and black hairs on clypeus, supra-clypeal region, occiput and cheeks below fulvous, those on sides of face, frons, and cheeks above black; occasionally black hairs predominant on head; hairs on thorax uniformly long fulvous or sometimes black hairs present on mesopleuron and lateral bases or greater part of propodeum; hairs on metasomal terga predominantly fulvous, those on 1st and basal half of 2nd long.

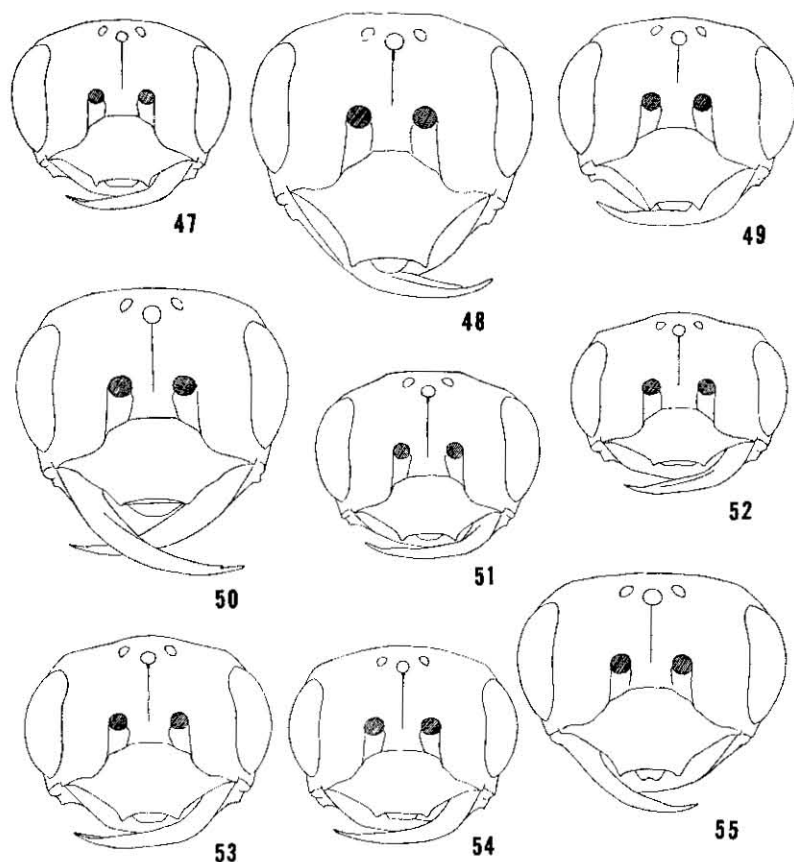
Structure: Head large, broader than thorax; mandibles long, falciform, with sharp apices; basal projection of mandible rather small for size of mandible; malar space wide, about one-third time as long as base of mandible, or about as wide as longitudinal width of mid ocellus, smooth and shiny; process of labrum transverse, roundly convex, smooth and shiny; clypeus very slightly convex, occasionally apical portion flattened, narrowly tessellate basally, broadly smooth, shiny, rather densely and not strongly punctate, without any trace of median, raised, impunctate line; clypeus not much exceeding line running bases of eyes, its index about 1.7:2.0; facial quadrangle slightly longer than broad (about 9:7.2); antennae long, 3rd segment approximately twice as long as broad at apex, longer than 4th which is a little shorter than 5th and about one and one-half times as long as broad; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.5:1.7:3.5:6.2; cheeks elongate posteriorly, about twice as broad as eyes seen in profile, rather receding, angulate behind, smooth and weakly punctate near eyes, tessellate and duller elsewhere. Mesoscutum densely tessellate, sparsely and shallowly punctate, dull; scutellum nearly as in mesoscutum; propodeum roughened, dull enclosure ill defined, wrinkled basally; mesopleuron a little less coarsely sculptured than in propodeum. Wings as in female. Legs slender, without special modification. First metasomal tergum tessellate, nearly dull; such sculpture becoming weaker toward apical terga; posterior depressions of terga broad, not sharply indicated, weakly tessellate or nearly smooth. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Hokkaido and Honshu).

Specimens examined: from *Hokkaido*: 9 males and 3 females, on flowers of *Petasites japonicus*, Sapporo, 25. iv.-8. v. 1947 (S. F. Sakagami); from *Honshu*: 3 females, Gaga, Mt. Zao, Miyagi Pref., 24-25. v. 1958 (R. Ishikawa); 7 males,

Yonezawa, Prov. Unzen, 13. iv. 1946 (Y. Kurosawa); 1 male, Yumoto Nikko, Tochigi, Pref., 22-24. v. 1957 (R. Ishikawa); 1 male and 1 female, Toyotama, Nerima-ku Tokyo, 29. iii. 1950 (R. Ishikawa); 1 male, on *Salix* sp., Sasayama, Prov. Tanba, 24. iii. 1952 (S. Taniguchi); 1 female, on *Salix* sp., Campus, Department of Agriculture, Shinshu University, Ina City, 7. iv. 1961 (Y. Maeta).

Flower records: Females and males have been collected on *Petasites japonicus* Mig., and *Salix* spp. According to Miyamoto (1960), this species visits the flowers of *Pieris japonica*, *Astragalus sinicus*, *Citissus scoparius*, *Prunus salicina*, *Fragaria chiloensis*, *Brassica campestris*, *Capsella bursa-pastoris*, *Stellaris media*, and *Salix yoshinoi*.



Figs. 47-55. Front view of head of male *Andrena* (*Andrena*). figs. 47: *brevihirtiscopa* sp. nov.; fig. 48: *mikado* Strand et Yasumatsu; fig. 49: *longitibialis* sp. nov.; fig. 50: *nawaii* Cockerell; fig. 51: *esakii* Hirashima; fig. 52: *benefica* sp. nov.; fig. 53: *saragamineensis* sp. nov.; fig. 54: *aburana* sp. nov.; fig. 55: *ishiharai* Hirashima.

(6) *Andrena (Andrena) esakii* Hirashima

Andrena (Andrena) esakii Hirashima, 1957, Mushi, 30 : 49, female.

This species is a relative of *Andrena helvola* Linné of Europe, and can readily be distinguished from that species. The female has the more strongly punctate clypeus, the shorter ocellocipital space, and the less coarsely sculptured meso-scutum. The male is easily distinguishable from that of *helvola* by the larger basal projection of the mandible, the more strongly convex clypeus and the longer third antennal segment. The genitalia and subgenital sterna are also much different.

This species is not allied to any of the Japanese species of the same subgenus, and the recognition of it is rather easy. This was originally described by the female from Mt. Hikosan, Kyushu, and a short series of males has been collected at the same locality. So far as the present data is concerned, it appears in May and has a generation in a year.

Female: Length about 11 mm.

Colour: Black; mandibles reddened apically; flagellum beneath distinctly brownish; wings smoky, distal margins slightly darkened; veins and stigma brownish; tegulae brownish subhyaline posteriorly, deeper brown anteriorly; legs piceous, mid basitarsi and hind tibiae and tarsi reddish brown; tibial spurs pale yellowish brown; posterior margins of metasomal terga brownish.

Pubescence: Hairs on body not specially long and dense, fulvous mixed with fuscous ones; hairs on clypeus sparse, pale as well as those on antennal regions, occiput and cheeks; hairs on sides of face, frons, vertex and cheeks near eyes blackish; facial fovea blackish, appears chocolate in some light; hairs on thorax nearly fulvous above, paler below, mixed with sparse brownish ones on meso-scutum; legs without blackish hairs; trochanteral and femoral floccus not at all pure white, slightly dull grayish; tibial scopa creamy white, compact, composed of well arranged, soft, simple hairs; hairs on metasomal terga fulvous, not mixed with blackish ones; caudal fimbria brownish.

Structure: Head of moderate size, nearly as broad as thorax seen from above; mandibles moderately long and stout; malar space narrow, a little less than one-fourth as long as base of mandible; clypeus strongly convex, broadly tessellate basally, gradually becoming smoother toward apex where it is nearly smooth and shiny; punctures on clypeus irregular, rather coarse and strong, much coarser and stronger than in *helvola*, with a trace of median, raised, impunctate line; clypeus slightly exceeding line running bases of eyes, its index 2:1.6; antennae somewhat long, 3rd segment slightly longer than next two segments taken together; ratio of postocellar width to ocellocipital distance to postocellar distance to ocellocular distance is 1.7:1.5:3.2:5.4; facial quadrangle slightly longer than broad (about 8.8:6.8); cheeks a little narrower than eyes seen in profile, receding, tessellate, rather distinctly punctate with punctures smaller near eyes. Meso-scutum narrowly densely tessellate anteriorly, broadly weakly so or nearly smooth medially, shiny, with punctures much smaller and weaker than those on center of clypeus; scutellum densely tessellate-punctate, dull; propodeum rather strongly roughened, dull enclosure ill defined, granular, wrinkled basally; mesopleuron densely tessellate, somewhat coarsely, not specially densely punctate. Wings with 2nd submarginal cell receiving 1st recurrent vein near end of cell; basal vein nearly interstitial. Legs with mid basitarsi slightly expanded medially,

subequal to hind basitarsi in width. Metasomal terga densely tessellate-punctate, nearly dull.

Male (New to science): Length about 8 mm.

Colour: Black; mandibles red apically; flagellum distinctly brownish beneath; wings and tegulae nearly as in female; legs piceous, tibiae more reddened, tarsi reddish brown; metasoma piceous, posterior margins of terga pale yellowish brown hyaline.

Pubescence: Hairs on head, thorax and 1st metasomal tergum long, not specially dense, paler than in female; hairs on clypeus, supraclypeal regions, occiput and cheeks below pale, those on sides of face, frons, vertex, and cheeks fuscous; hairs on thorax dull, more yellowish than those on clypeus, intermixed with fuscous hairs on mesoscutum, scutellum and mesopleuron, and sometimes further on lateral bases of propodeum; hairs on legs pale; hairs on median base of 2nd tergum somewhat long, pale, those on 3rd to 5th terga short, brownish; hairs on 6th tergum long, bright, distinctly yellowish.

Structure: Head large, much broader than thorax seen from above; mandibles long, slender, curved, falciform, with sharp apices; basal projection of mandibles rather small for size of mandible; malar space narrow, about or a little less than one-fourth as long as base of mandible except projection; process of labrum short, transverse, not specially roundly convex, smooth and shiny; clypeus well convex, sometimes distinctly so subanteriorly, smooth and shiny medially; clypeus densely punctate, especially so laterally and anteriorly, sparsely and strongly punctate medially, frequently with a short trace of median, raised, impunctate line; clypeus only slightly exceeding line running bases of eyes, its index 1.4:1.2; antennae long, 3rd segment about twice as long as broad, distinctly longer than 4th which is about one and one-half times as long as broad and a little shorter than 5th; facial quadrangle slightly longer than broad (about 6.7:5.8); ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.5:2.7:5; cheeks elongate and angulate behind, much broader than large eyes seen in profile, receding, tessellate, distinctly punctate, weakly shiny. Mesoscutum densely tessellate, sparsely and not distinctly punctate, dull, or sometimes disc nearly smooth and shiny medially; scutellum densely tessellate, dull; propodeum distinctly roughened, dull; enclosure somewhat well defined, granular, rugose basally; mesopleuron densely tessellate, somewhat coarsely, not specially densely punctate. Wings as in female. Legs slender, hind femora slightly convex above subbasally. First metasomal tergum distinctly tessellate, 2nd and following terga weakly so, nearly impunctate, weakly shiny; posterior depressions of terga not sharply indicated. Genitalia and subgenital sterna as illustrated.

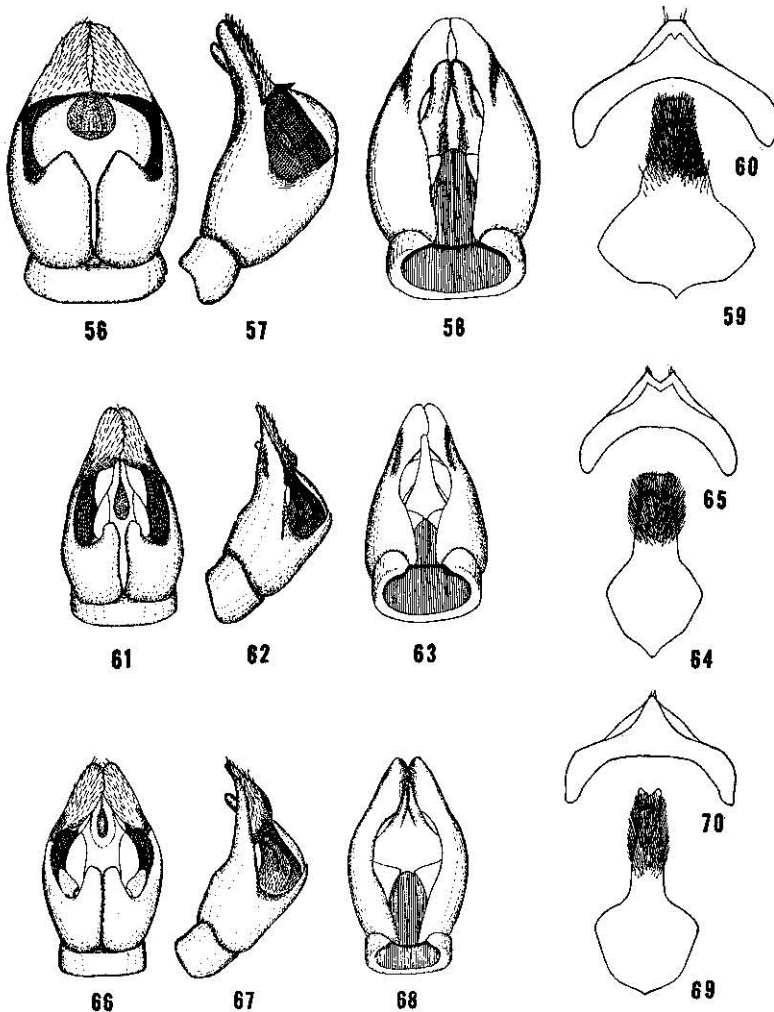
Distribution: Japan (Kyushu and Shikoku). This is the first record of this species from Shikoku.

Specimen sexamined: from *Kyushu*: 4 males (one is allotype), Mt. Hikosan, Prov. Buzen, 1000 m., 4. v. 1937 (K. Yasumatsu); 8 males, same locality as above, 6. v. 1951 (Y. Hirashima); from *Shikoku*: 1 male, Omogo, Prov. Iyo, 26. iv. 1953 (T. Yano).

Flower record: Not available.

(7) *Andrena (Andrena) longitibialis* sp. nov.

The female of this species is easily distinguished from all other members of the subgenus by its slender form, the slender hind tibiae, and the loose and large



Figs. 56-70. Genitalia and associated structures of male *Andrena (Andrena)*.

Figs. 56-60: *nawai* Cockerell, 56: dorsal view of genitalia, 57: lateral view of the same, 58: ventral view of the same, 59: 8th sternite, 60: 7th sternite; figs. 61-65: *esakii* Hirashima, 61: dorsal view of genitalia, 62: lateral view of the same, 63: ventral view of the same, 64: 8th sternite, 65: 7th sternite; figs. 66-70: *longitibialis* sp. nov., 66: dorsal view of genitalia, 67: lateral view of the same, 68: ventral view of the same, 69: 8th sternite, 70: 7th sternite.

tibial scopa which is composed of long, coarse, simple, not well arranged hairs. The hairs on the body are rather scanty. The male of this species has the short malar space and the long third antennal segment. Insofar as these characters of the male are concerned, it resembles that of *Andrena esakii* Hirashima, but can be distinguished from *esakii* by the longitudinally convex clypeus (rather transversely so in *esakii*), the smoother first metasomal tergum and the structures of the genitalia and subgenital sterna.

A series of male and female specimens has been collected from the mountainous regions of Honshu, Shikoku and Kyushu. The collecting data indicate that this species appears from April to July. It seems probable from that data that it has two generations in a year.

Female: Rather slender, length 11-12 mm.

Colour: Black; mandibles reddened apically; flagellum beneath reddish brown; wings slightly brownish subhyaline, veins and stigma pale brown; tegulae brownish or reddish brown, subhyaline posteriorly, piceous anteriorly; legs piceous, sometimes hind tibiae and tarsi more reddened; tibial spurs pale; posterior margins of metasomal terga reddish brown to pale yellowish brown hyaline.

Pubescence: Hairs on head and thorax not specially long and dense, not obscure integuments, dull, pale, or pale fulvous and fuscous; hairs on face, occiput and cheeks dull whitish, those on sides of face, frons, vertex, and cheeks near eyes fuscous; facial fovea blackish; hairs on thorax pale above and whitish below, occasionally mixed with sparse fuscous ones on mesoscutum or sometimes hairs on mesoscutum pale fulvous; hairs on outer faces of fore and mid tibiae and basitarsi nearly fuscous; trochanteral and femoral floccus nearly silver white; tibial scopa silver white in front, brown posteriorly (above); tibial scopa large, loose, composed of long, not well arranged, coarse, simple hairs; hairs on 1st metasomal tergum long, dull whitish, those on following terga scanty, short, pale and brownish; caudal fimbria bright, brownish or occasionally yellowish.

Structure: Head moderate; mandibles long and robust; malar space narrow, about one-fifth as long as base of mandible; clypeus strongly convex, tessellate and distinctly punctate over basal half, nearly smooth and sparsely and a little more strongly punctate anteriorly, shiny, with a trace of median, raised, impunctate line; clypeus not much exceeding line running bases of eyes, its index 18:2.0; facial quadrangle longer than broad (about 9:6.8); antennae moderately long, 3rd segment subequal to 4th plus 5th in length; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.7:1.7:3.4:5.7; cheeks slightly broader than eyes seen in profile, more or less receding, tessellate posteriorly, nearly smooth, shiny and weakly punctate near eyes. Mesoscutum densely tessellate, somewhat coarsely, more or less densely punctate, dull, occasionally median portion slightly smoother; scutellum nearly as in mesoscutum; propodeum roughened, dull; enclosure large, wrinkled nearly basal half, finely tessellate apically; mesopleuron nearly as coarse as dorsal face of propodeum. Wings with 2nd submarginal cell receiving 1st recurrent veins near end of cell; basal vein slightly to distinctly distad of nervulus. Legs slender; mid basitarsi scarcely expanded, a little narrower than hind ones; hind basitarsi elongate, scarcely widened subapically, about six times as long as wide near apex (for comparison, it is about four and one-half times as long as broad in *Andrena nipponica* Cockerell). Metasomal terga weakly to rather distinctly tessellate nearly impunctate; posterior depressions broad, not sharply indicated.

Male: Length about 8 mm.

Colour: Black; mandibles reddened apically; flagellum brownish beneath wing and tegulae nearly as in female; legs piceous, tarsi brownish; metasoma nearly piceous, posterior margins of terga brownish hyaline.

Pubescence: Hairs on head, thorax and 1st metasomal terga long, not specially dense, dull, pale and fuscous; hairs on face, including clypeus, occiput and cheeks below pale to whitish, those on the rest of head fuscous; hairs on thorax pale or pale brownish yellow above, whitish below, occasionally intermixed with sparse fuscous ones on mesoscutum; hairs on legs pale; hairs on metasoma pale, without blackish ones; hairs on 6th terga long, yellowish.

Structure: Head large, much broader than thorax seen from above; mandibles long, curved, falciform, with sharp apices; basal projection of mandible long, rather narrow; malar space narrow, about or less than one-fourth as long as base of mandible except basal projection; process of labrum short, transversely convex, smooth and shiny; clypeus somewhat distinctly convex longitudinally, narrowly tessellate basally, broadly smooth and rather sparsely and not strongly punctate; clypeus slightly exceeding line running bases of eyes, its index about 1.5:1.5; facial quadrangle slightly longer than broad (about 7.7:6.4); antennae elongate, 3rd segment about twice as long as broad, longer than 4th which is about one and one-half times as long as broad and a little shorter than 5th; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is about 1.5:1.5:3.2:5.4; cheeks elongate and angulate behind, about one and one-half times as broad as eyes seen in profile, rather broadly smooth near eyes, tessellate posteriorly, with punctures sparse and not strong. Mesoscutum densely tessellate, sparsely and rather weakly punctate, dull; scutellum nearly as in mesoscutum but smoother subbasally; propodeum roughened, dull; enclosure ill defined, weakly tessellate apically, wrinkled basally; mesopleuron a little less coarsely sculptured than in propodeum, dull. Wings nearly as in female. Legs slender, hind tibiae not specially elongate. Metasomal terga, especially 1st, weakly tessellate or nearly smooth, shiny, feebly punctate; posterior depressions of terga broad, not sharply indicated. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Honshu, Shikoku and Kyushu).

Type material: Holotype female, allotype male, Nasu, Yumoto, Honshu, 21. v. 1958 (R. Ishikawa); 4 paratype females, Mt. Hakkoda, Prov. Mutsu, Honshu, 6. vii. 1958 (Y. Hirashima); 3 paratype males, Gage, Mt. Zao, Miyagi Pref., 24-25. v. 1958 (R. Ishikawa); 2 paratype females, Karuizawa, Nagano Pref., 21. vi. 1956 (R. Ishikawa); paratype female, Mt. Mitake, Tokyo, 29. iv. 1952 (R. Ishikawa); 1 paratype female, Mt. Saragamine, Prov. Iyo, Shikoku, 1. vi. 1955 (S. Ueda); 1 paratype female, Mt. Hikosan, Prov. Buzen, Kyushu, 1,000 m., 4. v. 1937 (K. Yasumatsu); paratype female, same locality as above 27. v. 1938 (Esaki, Nomura and Yasumatsu); paratype female, same locality as above, 13. v. 1955 (Esaki, Yasumatsu et Hirashima).

Type depositories: Holotype, allotype, 7 paratype females and 2 paratype males are preserved in the collection of the Entomological Laboratory, Kyushu University; 1 paratype male and 3 paratype females to the collection of the Entomological Laboratory, Ehime University; 1 paratype male and 2 paratype females to the collection of R. Ishikawa.

Flower record: Not available.

(8) *Andrena (Andrena) maukensis* Matsumura

Andrena maukensis Matsumura, 1911, J. Coll. Agr., Tohoku Imp. Univ., 4: 107, female; Yasumatsu, 1941, Peking Nat. Hist. Bull., 15: 277.

So far as the female is concerned, this species is very close to *Andrena fucata* Smith of Europe. It differs from the latter by having the clypeus a little more strongly convex and slightly more coarsely punctate, the hind tibiae and tarsi darker and the hairs on the apical metasomal terga paler.

This species was originally described from Mauka, Saghalien and not a few females has been collected from Japan. In Japan it appears primarily in July and the habitat is limited to the alpine regions of Hokkaido and northern Honshu.

Female: Length 10–11 m.

Colour: Black; mandibles reddened apically; flagellum beneath reddish brown; wings slightly brownish subhyaline, veins and stigma reddish brown; tegulae reddish brown posteriorly, deep brown anteriorly; legs piceous, mid basitarsi and hind tibiae and tarsi dark ferruginous, posterior margins of metasomal terga reddish brown to brownish.

Pubescence: Hairs on head rather scanty, not specially long; clypeus broadly nearly free of hairs anteriorly; hairs on face, occiput and cheeks below pale, those on sides of face, frons and cheeks fuscous; facial fovea chocolate; hairs on thorax nearly uniformly dull pale fulvous, neither specially long nor dense; frequently sparse brownish hairs present on mesoscutum; trochanteral and femoral floccus not all white, slightly yellowish; tibial scopa more yellowish, nearly golden, narrowly brownish above basally; tibial scopa well developed, composed of long, more or less well arranged, soft hairs; hairs on metasomal terga scanty, predominantly yellowish, including caudal fimbria mixed with short brownish ones on 3rd and 4th terga.

Structure: Head moderate in size; mandibles moderately long and stout; malar space narrow, about one-fourth times as long as base of mandible; clypeus well convex, distinctly tessellate basally and feebly so or occasionally nearly smooth anteriorly, irregular and more or less coarsely punctate, without a median, raised, impunctate line; clypeus not much exceeding line running bases of eyes, its index about 2:1.5; antennae moderate in length, 3rd segment as long as next two segments together; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.7:2:3.2:5.5; facial quadrangle slightly longer than broad (about 8.7:6.7); cheeks broader than eyes seen in profile, more or less receding, tessellate except for portions near eye where they are nearly smooth and densely acupunctate. Mesoscutum densely tessellate punctate, dull except for median portion where it is feebly shiny; scutellum nearly as in mesoscutum; propodeum densely tessellate with indistinct shallow punctures, dull; enclosure ill defined, wrinkled basally; mesopleuron nearly sculptured as in dorsal face of propodeum. Wings with 2nd submarginal cell receiving 1st recurrent vein beyond middle or near end of cell; basal vein nearly interstitial of distad of nervulus. Metasoma rather elongate, distinctly tessellate including posterior depressions, sparsely and indistinctly punctate, weakly shiny; posterior depressions of terga broad, not sharply indicated.

Male: Unknown

Distribution: Saghalien and Japan (Hokkaido and Honshu). This is the first record of this species from Hokkaido and Honshu.

Specimens examined: from Hokkaido: 1 female, Aizankei, Prov. Ishikari, 29.

vii. 1952 (T. Shirozu); 1 stylopized female, Nukabira, Prov. Tokachi, 1-4. viii. 1953 (Y. Hirashima); 3 females, Ikomanbetsu, Mt. Daisetsu, 23-25. vii. 1955 (Y. Hirashima); 1 female, Nukabira, Prov. Tokachi, 4-5. vii. 1957 (R. Ishikawa); 1 female, Nukabira, Tokachi, 1. vii. 1960 (H. Yamamoto): from Honshu: 4 females, on flowers of *Vaccinium vitis-idaea*, Mt. Hakkoda, Prov. Mutsu, 6. vii. 1958 (Y. Hirashima).

Flower record: As recorded above, females have been collected on *Vaccinium vitis-idea* L.

(9) *Andrena (Andrena) shirozui* sp. nov.

This is a sibling species to *Andrena maukensis* Matsumura, with the malar space and clypeus a little more elongate and more shiny, the hairs on head mostly fuscous, and the tibial scopa larger and a little more loose.

It seems probable that this species has one generation in a year. Females appear from mid June to July and they have collected in the alpine regions of Hokkaido and northern Honshu.

Female: Length 10-12 mm.

Colour: Black mandibles reddened apically; flagellum beneath brownish; wings brownish subhyaline, veins and stigma reddish brown; tegulae brownish transparent posteriorly, deep brown anteriorly; legs piceous, hind tibiae and tarsi distinctly reddened (deeper red than in *maukensis*); tibial spurs pale ferruginous; posterior margin of metasomal terga yellowish brown hyaline.

Pubescence: Hairs on head rather long, not specially dense, nearly uniformly fuscous except for paler hairs on occiput; hairs on thorax long (longer than in *maukensis*), not specially dense, dull pale fulvous above, paler below, without admixture of brown hairs on thorax above; trochanteral and femoral floccus nearly white; tibial scopa white in front, slightly brownish behind (above); tibial scopa large, composed of long, dense, not well arranged, simple hairs which are longer than in *maukensis*; hairs on metasomal terga pale, those on 1st and 2nd much longer than those on 3rd and 4th; caudal fimbria bright brown (darker than in *maukensis*).

Structure: Head rather small, a little narrower than thorax including tegulae (head nearly as broad as thorax in *maukensis*); mandibles moderate; malar space shiny, more or less broad, approximately one-third time as long as base of mandible; clypeus well convex, tessellate-punctate basally, broadly smooth or nearly so (therefore more shiny than in *maukensis*) and rather sparsely punctate anteriorly, with a trace of median, raised, impunctate line; clypeus more or less distinctly exceeding line running bases of eyes, its index about 1.9:2; antennae of moderate length, 3rd segment about as long as next two segments taken together; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.7:2:3.7:5.8; cheeks broader than eyes seen in profile, rather receding usually a little less coarsely sculptured and more shiny than in *maukensis*. Mesoscutum densely tessellate-punctate, dull; scutellum nearly as in mesoscutum; propodeum nearly roughened (a little more densely sculptured than in *maukensis*), dull; enclosure rugose basally; mesopleuron tessellate and sparsely punctate, a little less coarsely sculptured than in propodeum. Wings with 2nd submarginal cell receiving 1st recurrent vein near end of cell; basal vein interstitial with or slightly distad of nervulus. Metasomal terga densely

tessellate, sparsely and weakly punctate, weakly shiny; posterior depressions of terga broad, not well indicated.

Male: Unknown.

Distribution: Japan (Hokkaido and Honshu).

Type material: Holotype female and 2 paratopotype females, Nukabira, Tokachi, Hokkaido, 4-5. vii. 1957 (R. Ishikawa); paratype female, Aizankei, Prov. Ishikari, Hokkaido, 29. vii. 1952 (T. Shirozu); paratype female, Ikomanbetsu, Mt. Daisetsu, 23-25. vii. 1955 (Y. Hirashima); paratype female, Metou, Ashoro-gun, Hokkaido, 19. vi. 1957 (M. Takahashi); 2 paratopotype females, 1. vii. 1960 (H. Yamamoto); 6 paratype females, on flowers of *Vaccinium vitis-idaea* and *Leucothoe* sp., Mt. Hakkoda, Prov. Mutsu, 6. vii. 1958 (Y. Hirashima); 4 paratype females, on *Vaccinium vitis-idaea*, Mt. Zao, Prov. Unzen, 9. vii. 1958 (Y. Hirashima).

Type depositories: Holotype and 13 paratype females are deposited in the collection of the Entomological Laboratory, Kyushu University, and two paratype females to the collection of R. Ishikawa.

Specimen examined other than type material: 1 stylopized female, same data as holotype.

Flower records: *Vaccinium vitis-idaea* L. and *Leucothoe* sp.

This species is named for the honour of Dr. Takashi Shirozu of Kyushu University.

(10) *Andrena (Andrena) hondoica* sp. nov.

Although the pubescence of the body, especially that of the abdomen, is less abundant, this species seems to belong to the group of *Andrena praecox* Scopoli of Europe. The head, including the clypeus, and thorax are densely covered with long hairs which, however, but slightly or hardly obscure the integument of mesoscutum. The clypeus of the male is specifically covered with long (especially so on the anterior margin) dense hairs, the aspect of which is somewhat like that of certain species of *Osmia*. The female of this species can readily be separated from that of *praecox* by the sparser and paler pubescence, the more wrinkled enclosure of the propodeum, the slender basitarsi of the mid legs, and less tessellate metasomal terga, and the male is more easily separated from *praecox* by the much smaller basal projection of the mandible and the absence of the black hairs on the propodeum.

This species appears early in spring (March to April), and a short series of female and only one male specimens has been collected in Honshu.

Female: Length 9.5-10.5 mm.

Colour: Black; mandibles reddened apically; flagellum beneath brownish; wings nearly hyaline, distal margins slightly darkened; veins and stigma yellowish brown to occasionally distinctly yellowish; tegulae reddish brown or sometimes nearly piceous; legs piceous, occasionally hind tibia and tarsi more reddened or reddish brown; tibial spurs yellowish; posterior margins of metasomal terga rather broadly brownish to transparent pale yellowish brown.

Pubescence: Hairs on face including clypeus dense and long (rather uniform in length); hairs on clypeus, supraclipeal and antennal regions, occiput and cheeks sooty white, those on sides of face, frons, vertex and cheeks near eyes fuscous; facial fovea blackish; hairs on thorax dense, long, but slightly obscure integument, dull, sooty white to slightly yellowish or indistinctly brownish above,

grayish white below, not mixed with blackish ones on any portion; hairs on outer faces of fore and mid tibiae and basitarsi brownish; trochanteral floccus white; femoral floccus silver white; tibial scopa silver white in front, broadly brownish posteriorly; tibial scopa moderate in size, compact, composed of moderately long, well arranged, simple hairs; hairs on metasomal terga much sparser than those on thorax, long on basal terga, dull white, without admixture of brown or blackish hairs; caudal fimbria brown.

Structure: Head moderate; mandibles rather short, robust; malar space about or a little less than one-fourth as long as base of mandibles; process of labrum strongly tapering apex, subtriangular, with apical margin entire; clypeus rather strongly convex, tessellate nearly all over or occasionally narrowly nearly smooth anteriorly, dull, densely punctate with punctures becoming stronger and slightly sparser toward apex; clypeus only slightly exceeding line running bases of eyes, its index 2:1.3; facial quadrangle slightly longer than broad (about 8.2:7.8); antennae rather short, 3rd segment longer than 4th plus 5th; 4th segment a little broader than long, 5th nearly as long as wide, 6th and following segments a little longer than broad; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.5:1.9:3.7:5.6; cheeks slightly broader than eyes seen in profile, receding, narrowly nearly smooth near eyes, broadly tessellate posteriorly, feebly punctate. Mesoscutum densely tessellate, sparsely and weakly punctate, dull; scutellum nearly as in mesoscutum; propodeum densely tessellate or a little roughened, only a little coarser than mesoscutum, dull; enclosure ill defined, tessellate, distinctly wrinkled basally; mesopleuron densely tessellate, weakly punctate, nearly as coarse as dorsal face of propodeum. Wings with 2nd submarginal cell receiving 1st recurrent vein near end of cell; basal vein much distad of nervulus. Legs with mid basitarsi slender (more slender than in *praecox*), subequal to hind basitarsi in width. Metasomal terga densely tessellate, nearly impunctate, nearly dull or feebly shiny; posterior depressions of terga broad, not sharply indicated.

Male: Length slightly over 8 mm.

Colour: Black; mandibles red apically; flagellum brown beneath; wing nearly hyaline, veins and stigma reddish brown; tegulae nearly piceous; legs piceous or more reddened; posterior margins of metasomal terga rather broadly brownish subhyaline.

Pubescence: Hairs on clypeus, supraclypeal region and sides of face long dense, well arranged and obscure integument; hairs on clypeus, supraclypeal region, scapes, occiput and cheeks below white, those on sides of face, frons and cheeks near eyes and above or occasionally broadly fuscous; hairs on thorax long, dense, but slightly obscure integument, nearly uniformly dull white or intermixed with black hairs; hairs on legs white to yellowish, without brownish ones; hairs on 1st and base of 2nd terga long, those on the rest of 2nd and following terga shorter, white to grayish, without admixture of blackish hairs.

Structure: Head large (but not specially so), broader than thorax seen from above; mandibles slender, not specially long, curved, falciform, with sharp apices; basal projections of mandibles small; malar space narrow, about one-fifth as long as base of mandible excluding basal projection; process of labrum tapering toward apex where it is slightly roundly convex; clypeus nearly flat, feebly shiny, densely punctate all over with punctures small and rather deep; clypeus shiny, densely punctate all over punctures small and rather deep; clypeus only slightly

exceeding line running bases of eyes, its index is about 1.8:1.2; facial quadrangle indistinctly longer than broad (about 7:6.5), therefore, head appears distinctly transverse; antennae elongate, 3rd segment less than twice as long as broad, longer than 4th which is a little less than one and one-half times as long as broad, 5th segment a little more than twice as long as broad, subequal to following segments in length; ratio of postocellar width to ocellocipital distance to postocellar distance to ocellular distance is 1.4:1.9:3.7:5.5; cheeks elongate and angulate behind, about one and one-half times as broad as eyes seen in profile, tessellate and feebly punctate, except portion near eyes where it is narrowly nearly smooth and indistinctly punctate. Mesoscutum densely tessellate, weakly and sparsely punctate, dull; scutellum nearly as in mesoscutum; propodeum roughened, dull; enclosure ill defined, tessellate, distinctly wrinkled basally; mesopleuron densely tessellate, a little roughened above. Wings as in female. Legs slender, hind femora a little convex above. Metasomal terga tessellate, nearly impunctate, becoming smoother toward apical terga; posterior depressions of terga broad, not sharply indicated. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Hokkaido and Honshu).

Type material: Holotype male, allotype female, and 2 paratype females, on *Salix* sp., Campus, Shinshu Univ., Ina City, Nagano Pref., 3. iv. 1961 (Y. Maeta); paratype female and male, Wasadani, near Tsurugi-machi, Ishikawa Pref., 17. iii. 1949 (I. Togashi); paratype female, Kadota-mura, Fukushima Pref., 28. iii. 1950 (Y. Kurosawa); paratype female, Tsurugi-machi, Ishikawa Pref., 15. iii. 1953 (I. Togashi); paratype female, Koganezawa, Ueda, Nagano Pref., 3. iv. 1935 (S. Miyamoto); paratype female, on *Veronica caninotesticulate*, Sasayama, Prov. Tanba, 18. iii. 1952 (S. Taniguchi); paratype female, on *Salix* sp., same locality as above, 24. iii. 1952 (S. Taniguchi); paratype female, Sapporo, Hokkaido, 1. v. 1956 (K. Kamiyo); paratype male and 4 paratopotype females, on *Salix* sp., 3-7. iv. 1961 (Y. Maeta).

Type depositories: Holo-, allo- and 10 paratypes are in the Entomological Laboratory, Faculty of Agriculture, Kyushu University; 2 paratypes to the Entomological Laboratory, Shinshu University.

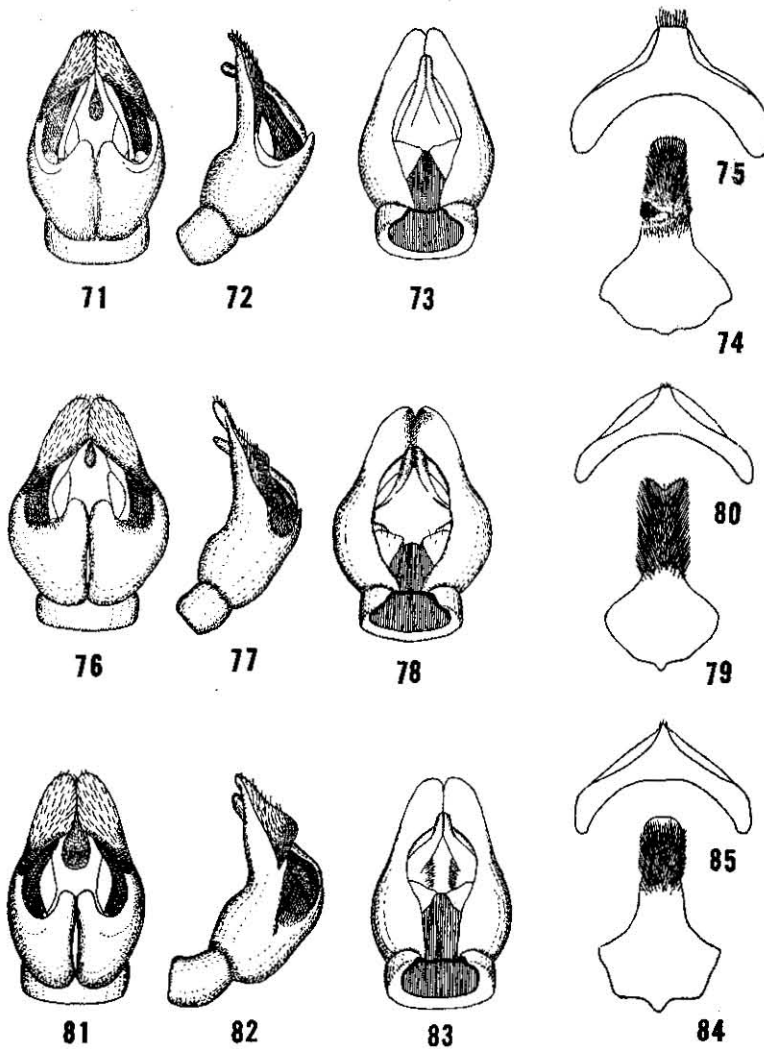
Flower records: *Veronica caninotesticulate* and *Salix* sp.

(11) *Andrena* (*Andrena*) *aburana* sp. nov.

The female of this species resembles that of *Andrena saragamineensis*, but is readily distinguished from the latter by the robust form, the more strongly convex and shiny clypeus, the more tessellate and less punctate mesoscutum, and the presence of blackish hairs on the mesoscutum. The male is more easily separated from that of *saragamineensis* by the longer malar space, the more convex clypeus, and the longer 4th antennal segment as well as the structure of the genitalia. So far as the convex clypeus of the male is concerned, this species is related to *Andrena esakii*, but is distinguishable from it by the weaker punctures on the clypeus, the longer (although slightly) malar space and the more tessellate mesoscutum.

A series of males and females has been collected from Honshu, Shikoku and Kyushu. This species appears from March to April, and is found on the flowers of *Brassica campestris*.

Female: Robust, length 10-11 mm.



Figs. 71-85. Genitalia and associated structures of male *Andrena* (*Andrena*). Figs. 71-75: *hondoica* sp. nov., 71: dorsal view of genitalia, 72: lateral view of the same, 73: ventral view of the same, 74: 8th sternite, 75: 7th sternite; figs. 76-80: *aburana* sp. nov., 76: dorsal view of genitalia, 77: lateral view of the same, 78: ventral view of the same, 79: 8th sternite, 80: 7th sternite; figs. 81-85: *saragamineensis* sp. nov., 81: dorsal view of genitalia, 82: lateral view of the same, 83: ventral view of the same, 84: 8th sternite, 85: 7th sternite.

Colour: Black; mandibles reddened apically; flagellum beneath brownish, occasionally reddish brown; wings brownish subhyaline, veins and stigma pale brown; tegulae brownish subhyaline posteriorly, deeper brown anteriorly; legs nearly black or slightly piceous; tibial spurs distinctly yellowish; posterior margins of terga narrowly brown.

Pubescence: Hairs on body not specially long and dense, dull, not obscure integument; hairs on clypeus sparse, pale as well as those on supraclypeal region, occiput and cheeks; hairs on sides of face, frons, vertex and cheeks near eyes fuscous; occasionally hairs on faces nearly all fuscous; hairs on mesoscutum rather short, somewhat sparse, variable in colour, nearly all fuscous to nearly all dark fulvous; hairs on scutellum fuscous medially, dark fulvous laterally; hairs on metanotum nearly dark fulvous; hairs on propodeum pale fulvous, with or without admixture of fuscous ones; hairs on mesopleuron whitish, with or without fuscous hairs above; hairs on outer faces of fore and mid tibiae and metatarsi brownish to nearly fuscous; trochanteral floccus grayish white; femoral floccus silver white; tibial scopa brownish to fuscous above (posteriorly), silver white in front, or sometimes broadly fuscous and only narrowly silver white in front; tibial scopa moderate in size, compact, composed of more or less long, well arranged, simple hairs; hairs on 1st and base of 2nd metasomal terga long, pale, those of following terga short, erect, pale and fuscous; hairs on posterior margins of terga downy, forming an indistinct band of 2nd to 4th in fresh specimens; caudal fimbria fuscous.

Structure: Head moderate, about as broad as thorax seen from above; mandibles moderately long and stout; malar space about or a little more than one-fourth as long as base of mandible, indistinctly widened posteriorly; clypeus strongly convex, tessellate nearly basal half, smooth and shiny anteriorly, with punctures irregular in size and distribution, rather coarse, occasionally broadly impunctate medially, usually with a trace of median, raised, impunctate line; clypeus slightly exceeding line running bases of eyes, its index about 1.9 : 2; facial quadrangle slightly longer than broad (about 9 : 7.3); antennae moderately long, 3rd segment indistinctly longer than 4th plus 5th; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.7 : 1.9 3.5 : 6; cheeks slightly broader than eyes seen in profile, receding, narrowly nearly smooth and feebly impunctate nearly eyes, tessellate and sparsely punctate posteriorly. Mesoscutum densely tessellate, not distinctly punctate, quite dull; scutellum nearly as in mesoscutum; propodeum roughened, dull; enclosure tessellate all over or occasionally rugulose basally; mesopleuron somewhat roughened, a little less coarsely sculptured than in propodeum. Wings with 2nd submarginal cell receiving 1st recurrent veins beyond middle of cell; basal vein distad of nervulus. Legs with mid basitarsi broad, indistinctly expanded medially, subequal to hind basitarsi in width. Metasomal terga, especially basal ones, densely tessellate, feebly punctate, becoming a little smoother toward apical terga; posterior depressions of terga broad, not sharply indicated.

Male: Length about or slightly over 8 mm.

Colour: Black; mandibles red apically; flagellum brownish beneath; wings slightly paler than in female; tegulae brownish subhyaline posteriorly, deeper brown anteriorly; legs piceous, tibiae and tarsi more reddened or brownish; metasoma not at all black, somewhat piceous, posterior margins of terga brownish subhyaline.

Pubescence: Hairs on head, thorax, 1st and base of 2nd metasomal terga long, not specially dense and, therefore, not obscure integument; hairs on heads nearly fuscous except for paler ones on base of clypeus, supraclypeal region, occiput and cheeks below; hairs on thorax pale or lightly more yellowish, mixed with fuscous ones on mesoscutum, scutellum, propodeum and mesopleuron or occasionally hairs on propodeum nearly all fuscous; hairs on legs pale to yellowish except for brownish to nearly fuscous ones on fore and mid femora and tibiae; hairs on basal metasomal terga paler, those on 3rd to 5th terga brownish; hairs on 6th tergum bright, golden.

Structure: Head large, much broader than thorax seen from above; mandibles long, curved, falciform, with sharp apices; basal projections of mandibles rather slender, nearly triangular; process of labrum transverse, not specially convex, smooth and shiny; clypeus well convex, especially strongly so subapically, narrowly tessellate basally, not specially densely punctate with punctures sparser on convexity; clypeus slightly exceeding line running bases of eyes, its index 1.4 : 1.5; facial quadrangle a little longer than broad (about 7.5 : 6.8); antennae long, 3rd segment about twice as long as broad at apex, longer than 4th which is as about one and one-half-times as long as broad and a little shorter than 5th; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.4 : 1.5 : 3.7 : 5.7; cheeks elongate and angulate behind, much broader than eyes seen in profile, nearly smooth near eyes and tessellate posteriorly, sparsely and rather weakly punctate. Mesoscutum densely tessellate, sparsely and shallowly punctate, dull; scutellum nearly as in mesoscutum; propodeum roughened, dull; enclosure ill defined tessellate, narrowly rugulose basally; mesopleuron nearly roughened, a little less coarsely sculptured than in propodeum. Wings as in female. Legs slender, without special modification. Metasomal terga tessellate, especially so on 1st, becoming smoother toward apical terga; posterior depressions of terga broad, not well indicated.

Distribution: Japan (Honshu, Shikoku and Kyushu).

Type material: Holotype male, Mt. Homan, Prov. Chikuzen, Kyushu, 18. iii. 1951 (Y. Hirashima); allotopotype female, 19. iv. 1931 (K. Yasumatsu); paratype female, Mt. Mitake, Tokyo, 27. v. 1952 (R. Ishikawa); paratype male and 2 paratype females, Mt. Mino, Prov. Settsu, Honshu, 6. iv. 1955 (K. Komatsu); paratype male, on *Brassica campestris*, Hagi, Yamaguchi Pref., 21. iv. 1960 (K. Nohara); paratype male, Sugitate, near Matsuyama, Shikoku, 8. iii. 1953 (T. Yano); paratype male, same locality as above, 21. iii. 1953 (T. Mori); 3 paratopotype females, 19. iv. 1931 (K. Yasumatsu); paratype female, on flowers of *Brassica campestris*, Kashii, Fukuoka, Kyushu, 19. iv. 1959 (Y. Hirashima); 2 paratype females, Narutakeyama, Prov. Chikuzen, 23. iv. 1950 (Y. Hirashima); paratype female, Kumamoto, Prov. Hyuga, 15. iv. 1958 (Y. Hirashima).

Type depositories: Holo-, allo- and 10 paratypes are deposited in the collection of the Entomological Laboratory, Kyushu University; 2 paratypes to the collection of the Entomological Laboratory, Ehime University; 1 paratype to the collection of R. Ishikawa; 3 paratypes to the collection of K. Komatsu.

Flower record: *Brassica campestris*.

(12) *Andrena (Andrena) saragamineensis* sp. nov.

So far as the female is concerned, this is a close relative of *Andrena maukensis*

Cockrell but is readily distinguishable from that species. The head is shorter, and the clypeus more strongly and coarsely punctate than in *maukensis*. The mesoscutum is more coarsely punctate and the hairs on it darker. This species also closely resembles *Andrena aburana* sp. nov. but can be distinguished from that species by the less convex and dull clypeus, which is tessellate all over, and the coarser punctures on the mesoscutum in the female, and the less convex clypeus, the shorter malar space, and the longer genitalia in the male.

This species is known only from Mt. Saragamine, near Matsuyama, Shikoku at the present time, and has been collected in mid April.

Female: Length about 10.5 mm.

Colour: Black; mandibles reddened apically; flagellum beneath reddish brown; wings faintly brownish subhyaline, veins and stigma brownish; tegulae brownish subhyaline posteriorly, deeper brown anteriorly; legs piceous, hind tibiae and tarsi slightly more reddened; tibial spurs pale ferruginous; posterior margins of metasomal terga brownish.

Pubescence: Hairs on head rather long, not specially dense, sooty to fuscous; facial fovea chocolate, hairs on thorax above rather short, dull fulvous, somewhat sooty, those on sides of thorax longer and paler; trochanteral and femoral floccus dull grayish white; tibial scopa silvery white, slightly brownish above basally; tibial scopa of medium size, compact, composed of well arranged, soft, single hairs; metasoma scanty of hairs; hairs on 1st tergum rather long, sparse, pale, those on following terga much shorter, pale; caudal fimbria sooty fulvous or brownish.

Structure: Head moderate, about as wide as thorax including tegulae seen from above; mandibles of medium size; malar space rather narrow, about one-fourth time as long as base of mandible; process of labrum transverse; clypeus well convex, tessellate all over, feebly shiny anteriorly, coarsely and rather strongly punctate, with a median, raised impunctate line; clypeus short, slightly exceeding line running bases of eyes, its index 2:1.3; antennae comparatively shorter than in *maukensis*, with 3rd segment a little longer than next two segments together; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellular distance is 1.6:1.5:3.1:5.6; cheeks nearly as broad as eyes seen in profile, rather receding, smooth and shiny near eyes and broadly tessellate posteriorly, sparsely and quite weakly punctate. Mesoscutum densely tessellate-punctate, with punctures coarse (although smaller and weaker than those on clypeus) medially, nearly dull or feebly shiny medially; scutellum nearly as in mesoscutum; propodeum, roughened, dull; enclosure ill defined; rugose; mesopleuron densely tessellate, with punctures indistinct, a little less coarsely sculptured than in propodeum. Wings with 2nd submarginal cell receiving 1st recurrent veins beyond or near end of cell; basal vein interstitial or slightly distad of nervulus. Legs with hind basitarsi indistinctly curved downwards. Metasomal terga densely tessellate, nearly impunctate, feebly shiny, posterior depressions of terga broad, not sharply indicated.

Male: Length 7-8 mm.

Colour: Black; mandibles reddened apically, flagellum piceous, more reddened apically; wings a little paler than in female, veins and stigma brownish; tegulae brownish subhyaline, darker anteriorly; legs and metasoma piceous; posterior margins of terga pale yellowish brown hyaline.

Pubescence: Hairs on head long, not dense, fuscous except for dull white

hairs on lower part of clypeus and cheeks below; hairs on thorax rather long, not specially dense, pale, mixed with fuscous one on scutellum, lateral bases of propodum and mesopleuron; hairs on legs pale; hairs on metasoma scanty, short, pale to slightly brownish except for longer and paler ones on 1st tergum; hairs on 6th tergum long and distinctly yellowish.

Structure: Head large, much broader than thorax seen from above; mandibles long, curved, falciform, with sharp apices; basal projection of mandible large, subtriangular, nearly pointed apically; malar space narrow, about or a little less than one-fourth as long as base of mandible except projection; clypeus transverse, very slightly convex, smooth and shiny except for bases, where they are tessellate and less shiny, irregularly punctate with punctures not specially coarse and strong; clypeus slightly exceeding line running bases of eyes, its index about 1.5:1.2; process of labrum short, transverse, roundly convex, smooth and shiny; antennae not specially elongate, 3rd segment about twice as long as broad at apex, longer than 5th segment which is nearly equal to each following segment in length, 4th segment about as long as wide, distinctly shorter than 5th; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.4:1.6:3:5.2; cheeks elongate and angulate posteriorly, rather receding, narrowly smooth near eyes and tessellate elsewhere, sparsely and weakly punctate; cheeks much broader than eye seen in profile (about 3:1.8). Mesoscutum densely tessellate, weakly punctate, dull; scutellum nearly as in mesoscutum; propodeum slightly roughened, dull; enclosure ill defined, rugose; mesopleuron nearly as coarse as or a little less coarsely sculptured than propodeum. Wings as in female. Legs slender, hind femora slightly swollen. Metasomal terga tessellate, nearly impunctate; posterior depressions of terga not sharply indicated, nearly smooth apically. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Shikoku).

Type material: Holotype male, allotype female and 2 paratype males, Mt. Saragamine, Prov. Iyo, Shikoku, 16. iv. 1952 (T. Ishihara); 2 paratype females, same data as holotype (T. Edashige).

Type depositories: Holo- and allotypes are in the collection of the Entomological Laboratory, Kyushu University, and 4 paratypes to the Entomological Laboratory, Ehime University.

Flower record: Not available.

(13) *Andrena (Andrena) benefica* sp. nov.

This is the smallest one of the Japanese species of the subgenus *Andrena*, and the recognition of it is of ease. The female is characterized by having the pubescence scanty, especially so on the metasoma, the hind tibiae comparatively short and widened subapically, and the tibial scopa rather small.

The hairs on the posterior margins of the 2nd to 4th metasomal terga are white and downy in the fresh specimens, forming an indistinct hair band on each tergum. The male of this species is easily recognized by the combination of characters such as the mandibles falciform and armed with a large projection basally, the malar space about one-fourth as long as the base of the mandible, the clypeus rather well convex and broadly smooth, the 3rd antennal segment longer than wide and as long as 4th, etc.

So far as the present data is concerned, this species appears from April to

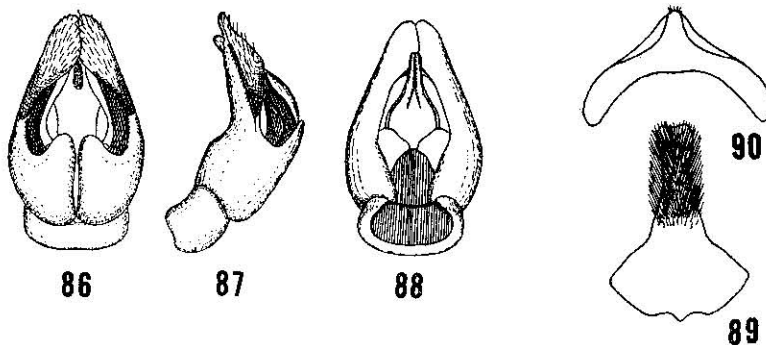
May and is found primarily on the flowers of *Brassica* spp.

Female: Length about or less than 9.5 mm.

Colour: Black; mandibles reddened apically, flagellum beneath distinctly brownish; wings nearly hyaline, distal margins slightly darkened; veins and stigma yellowish brown; tegulae nearly piceous or occasionally brownish subhyaline posteriorly; legs piceous, hind tibiae and tarsi more reddened or reddish brown; tibial spurs yellowish; posterior margins of metasomal terga rather broadly brownish.

Pubescence: Hairs on head rather short, not dense, white on face, including clypeus, occiput and cheeks, fuscous on frons, vertex and cheeks near eyes; facial fovea chocolate above, paler below; hairs on thorax rather short (on mesoscutum) to long (on propodeum and mesopleuron), not specially dense, pale yellowish brown above, whitish to white below, with or without sparse brownish hairs on mesoscutum; legs without blackish hairs; trochanteral floccus whit; femoral floccus silver white; tibial scopa silver white, narrowly and slightly brownish above basally; tibial scopa rather small, not specially compact, composed of well arranged, rather short to short hairs; hairs on metasomal terga scanty, white, not mixed with brown or brownish ones; caudal fimbria distinctly yellowish; hairs on posterior margins of 2nd to 4th terga downy, slightly denser than elsewhere, forming an obscure hair band on each tergum.

Structure: Head moderate, mandibles rather long and robust; malar space narrow, about one-fifth as long as base of mandible, a little widened posteriorly; clypeus rather strongly convex, more or less broadly tessellate basally, smooth or nearly so and shiny apically, rather coarsely and strongly punctate with punctures irregular in size and distribution; occasionally clypeus broadly smooth and sparsely punctate medially; clypeus slightly exceeding line running bases of eyes, its index about 1.7:1.4; facial quadrangle slightly longer than broad (about 7.6:6.2); antennae moderately long, 3rd segment about equal to next two segments taken together; ratio of postocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.3:1.4:3.2:5; cheeks about as wide as eyes seen in profile, receding, narrowly smooth near eyes, tessellate,



Figs. 86-90. Genitalia and associated structures of male *Andrena* (*Andrena*) *benefica* sp. nov.

Fig. 86: dorsal view of genitalia, 87: lateral view of the same.

88: ventral view of the same, 89: 8th sternite, 90: 7th sternite.

and weakly punctate posteriorly. Mesoscutum densely tessellate, rather distinctly and not so densely punctate, dull; scutellum rather broadly nearly smooth or weakly tessellate, sparsely punctate, shiny; propodeum roughened, dull; enclosure large, ill defined, densely tessellate, rugulose basally; mesopleuron densely tessellate, nearly roughened above, dull. Wings with 2nd submarginal cell receiving 1st recurrent veins near end of cell; basal vein interstitial with or distad of nervulus. Legs with mid basitarsi slightly widened medially, subequal to hind basitarsi in width; hind tibiae rather short, distinctly expanded subapically. Metasomal terga densely tessellate, nearly impunctate, feebly shiny; posterior depressions of terga broad, not well indicated.

Male: Length about 7.5 mm.

Colour: Black; mandibles reddened apically; flagellum brownish or reddish brown beneath; wing hyaline, distal margins slightly darkened; veins and stigma yellowish brown; regulae brownish subhyaline posteriorly, deeper brown anteriorly; legs piceous, tarsi and hind tibiae brownish; metasomal not at all black, slightly piceous, posterior margins brownish to brownish subhyaline.

Pubescence: Hairs on head long, not specially dense, nearly dull white or occasionally distinctly yellowish on clypeus, supraclypeal regions, scapes, occiput and cheeks below, fuscous on sides of face, frons, vertex and cheeks near eyes; hairs on thorax long, not specially dense, pale or sometimes pale yellowish brown, without admixture of brown or fuscous hairs; hairs on legs pale; hairs on 1st and base of 2nd terga long, sparse, those on following terga short, sparse, nearly uniformly pale; hairs on 6th terga yellowish.

Structure: Head large, much broader than thorax seen from above; mandibles long, slender, falciform, with sharp apices; basal projection of mandible large, nearly triangular; malar space narrow, about one-fourth as broad as base of mandible; process of labrum short, slightly convex apically; clypeus rather well convex medially, tessellate except for narrow median portion where it is nearly smooth, shiny, more sparsely and somewhat strongly punctate than elsewhere; occasionally clypeus broadly nearly smooth and sparsely punctate medially; clypeus only slightly exceeding line running bases of eyes, its index about 1.4:1.1; facial quadrangle nearly as long as broad (6.1:6); antennae long, 3rd segment longer than wide (approximately one and one-half times as long as broad), and approximately as long as 4th, which is indistinctly shorter than 5th; ratio of post-ocellar width to ocelloccipital distance to postocellar distance to ocellocular distance is 1.2:1.4:3:4.8; cheeks elongate and angulate behind, more than one and one-half times as broad as eyes seen in profile, smooth near eyes, broadly tessellate posteriorly, weakly and sparsely punctate. Mesoscutum tessellate, weakly and sparsely punctate, nearly dull or feebly shiny medially; scutellum broadly nearly smooth or weakly tessellate, sparsely and weakly punctate; propodeum roughened, dull; enclosure ill defined, dull. Wings with 2nd submarginal cell receiving 1st recurrent vein near end to near middle of cell; basal vein slightly to distinctly distad of nervulus. Legs slender, without special modification. Metasomal terga, especially basal ones, tessellate, becoming smoother toward apical terga, feebly shiny; posterior depressions not sharply indicated. Genitalia and subgenital sterna as illustrated.

Distribution: Japan (Hokkaido, Honshu and Kyushu).

Type material: Holotype male, Tachibanayama, Prov. Chikuzen, Kyushu, 13. iv. 1951 (Y. Hirashima); allotype female, 21. iv. 1951 (Y. Hirashima); paratype

female, Maruyama, Sapporo, Hokkaido, 9. v. 1944 (S. F. Sakagami); 2 paratype females, Mukogaoka, Kawasaki, Kanagawa Pref., 7. iv. 1957 (R. and M. Ishikawa); paratype female, Yoyogi, Tokyo, 16. iv. 1957 (R. Ishikawa); paratype female, Egota, Tokyo, 15. iv. 1951 (R. Ishikawa); paratype female, Atsugi, Kanagawa Pref., 6. iv. 1955 (R. Ishikawa); paratype female, Fukuoka, Kyushu, 2. iv. 1931 (K. Yasumatsu); paratype female, on flowers of *Brassica campestris*, same locality as above, 22. iii. 1952 (Y. Hirashima); paratopotype male and 3 paratopotype females, 4. iv. 1950 (Y. Hirashima); paratopotype female, 13. iv. 1951 (Y. Hirashima); 2 paratype males, Futsukaichi, Prov. Chikuzen, 6. iv. 1952 (C. Takeya); paratype male and 4 paratype females, on *Brassica*, Kumamoto, Prov. Higo, 1. iv. 1949 (Y. Hirashima); 4 paratype females, Mt. Hikosan, 10. v. 1951 (Y. Hirashima); 5 paratype females and 8 paratype males, on *Salix* sp., Campus, Shinshu Univ., Ina City, 7. iv. 1961 (Y. Maeta); 3 paratype females and paratype male, on *Prunus americana*, Mori, Koshoku City, Nagano, 19-20. iv. 1961 (Y. Maeta); 2 paratype females and 3 paratype males, on *Prunus mume*, Campus, Shinshu Univ., Ina City, 12-19. iv. 1961 (Y. Maeta); paratype female and male, on *Prunus* sp. (*Sakura*), same locality as above, 18. iv. 1961 (Y. Maeta); paratype female and 3 paratype males, on *Pyrus simonii*, same locality as above, 25. iv. 1961 (Y. Maeta).

Type depositories: Holo-, allo- and 40 paratypes are preserved in the collection of the Entomological Laboratory, Kyushu University; 5 paratypes to the collection of R. Ishikawa, and 8 paratypes to the Entomological Laboratory, Shinshu University.

Specimen examined other than type material: 1 stylopized female, Mt. Hikosan, Kyushu, 10. v. 1951 (Y. Hirashima).

Flower records: This species has been collected on flowers of *Brassica campestris*, *Prunus americana*, *Prunus mume*, *Prunus* sp. (*Sakura*), *Pyrus simonii*, and *Salix* sp.