Descriptions and Records of Wasps of the Families Chrysididae and Sphecidae of Japan (Hymenoptera)

By Katsuji TSUNEKI
(Biological Laboratory, Fukui University)

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I. ON RUBY-TAILED WASPS

1. **Hedychrum okai** sp. nov.[2]

? *Holopyga lewisi* Tosawa (nec Cameron) Trans. Kansai Entom. Soc., No. 2, p. 42, 1931.
Hedychrum lewisi Uchiba (nec Cameron) Cat. Jap. Ins., Fasc. II, Hym. Chrysid., p. 2, No. 11, 1933; —— Tsuneki, Matsumushi, Vol. 1, No. 1, p. 34, No. 9, 1946.

♂. Length 5.5 mm. Bluish green with shade of metallic golden on upper front, facial cavity, clypeus, sides of thorax and propodeum, and legs except tarsi; sides of 1st and 2nd abdominal tergites and marginal area except base of 3rd tergite with reddish effulgence, fading into golden-green anteriorly; the areas shown by dots in Fig. I, E deep purple or purplish black, antennae except basal two joints, mandibles, wingtegulae, tarsi of legs brownish black, veins of wings dark brown. Dorsal surface of body sparsely covered with rather long blackish hairs which are on vertex and thorax longer than 4th joint of antennae, hairs on ventral surface of body, mesopleuron and legs greyish white.

General feature of body as shown in Fig. I, E; the form and relative areas of head, thoracic parts and propodeum seen vertically from above : Fig. I, B. OOD : POD approximately 3 : 2, POD subequal to OCD, head seen in front with inner margins of eyes gently convergent below, but from near clypeus divergent, with face (lower front) twice as wide as eye, facial cavity rounded above, roundly excavated and transversely closely distinctly striated, clypeus strongly convex, its anterior margin broadly gently emarginate. Head seen in profile with temple narrowed below and carinate-striated downwards, oculo-mandibular space narrow, its length at the posterior margin less than as long

1) Contribution No, 5, from the Biological Laboratory, Fukui University, Fukui, Japan. This investigation was partly aided by the Scientific Research Fund from the Ministry of Education.

2) The specific trivial name was dedicated to the late Professor Asajiro Oka, a well-known specialist of Hirudinea and Protocordata, a theoretical biologist with keen insight and the respected teacher of the present writer.

as 5th antennary joint, lower margin deeply emarginate; relative lengths of antennal joints 2 : 3 : 4 = 6 (greenish area only) : 10 : 5 (Fig. I, A). Pro- and mesonotum reticulate-punctate, punctures on median lobe of mesonotum slightly sparse and smaller anteriorly, reticulation on mesopleuron as large as on scutellum, posteriorly turning into longitudinal striae and provided with

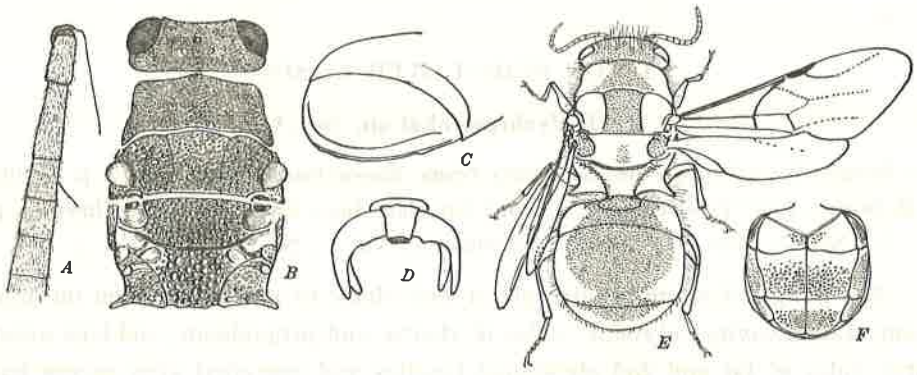

Fig. I. *Hedychrum okai* n. sp. ♂.

a smoothed area at the centre of striation; sides of propodeum rather obsoletely longitudinally striate. Legs normal, tarsal claws : Fig. 1, D. Abdomen flattened, rounded, the 3rd segment : Fig. 1, C, punctures on the disc of 1st tergite uniform, fine and close, becoming larger towards sides, on 2nd slightly larger and less close than on 1st (but with interspaces narrower than the punctures) and posteriorly and laterally larger, on 3rd similar in pattern, but generally somewhat larger. Punctures on the lateral portions of abdomen lengthwise elongate, partly subrugosely confluent. Ventral view and the punctuatoin : Fig. I, F.

♀. Very similar to ♂, differing from it in having the pubescence on head and thorax much shorter and pronotum nearly parallel-sided.

Holotype : ♂, Sapporo, 23. VII. 1944 (K. Tsuneki leg.)

Allotype : ♀. Mashiko, Tochigi Pref., 15. VI. 1949 (E. Tanaka leg.)

Paratypes : 1 ♂, Tokyo, 18. VI. 1933 (K. Tsuneki leg.); 1 ♀, 5. VIII. 1954, Koike, Fukui Pref. (K. Tsuneki leg.)

Remarks. This species has been erroneously identified with *H. lewisi* Cameron 1887. Having felt doubtful about this identification, the writer asked Dr. S. Asahina who was studying at the British Museum, to examine the type specimen of *H. lewisi*. According to his information it was ellucidated that *H. lewisi* was a quite different species from the one described here. Probably it belongs to the genus *Holopyga* as was dealt with by Mocaáry in 1889 and, moreover,

is presumed very close to, if not identical with, *Holopyga gloriosa* f. *viridis* (Guérin, 1842).

The present species can easily be separable from all the known species of the genus by the characteristic coloration of the abdomen. It can also be distinguished from such Japanese species as *H. japonicum* Cam. and *H. simile* Mocs. even by the form of the pronotum and by the character of the gena.

2. Chrysis (Tetrachrysis) komachi[3] sp. nov.

♀. Length 8.5 - 10.3 mm. Head and thorax metallic green. Vertex, upper front, neck, anterior surface and a broad band across the middle of pronotum, mesonotum wholly (sometimes a fleck on median lobe greenish), a large triangular macula on scutellum, a longitudinal line on postscutellum purplish black; sides of thorax with furrows and impressed areas coloured blackish; clypeus, temples below, anterior margin of pronotum (medianly narrowly interrupted) and epicnemia of mesopleura metallic golden; mandibles glittering black with a small testaceous spot near the apex, antennae with scapes and upper surface of pedicels greenish; legs golden green with a bluish tint on upper portion of front femora; remaining joints of antennae and tarsi of legs lustreless black. Abdomen fiery golden, 1st tergite at base broadly

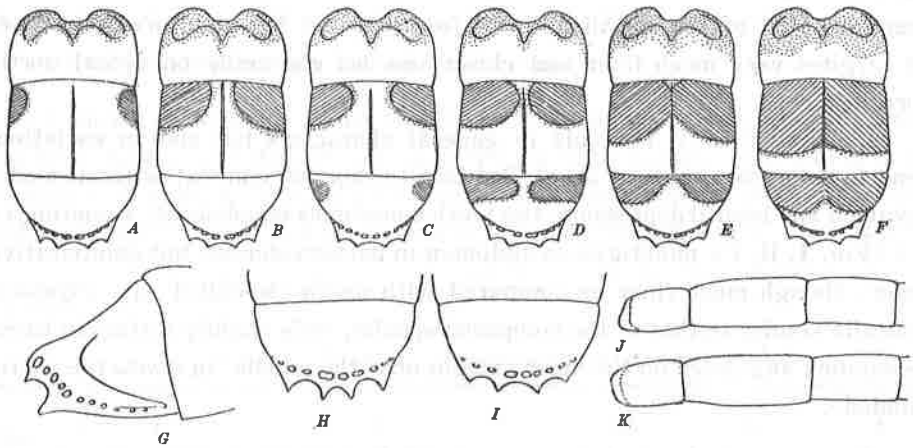

Fig. II. *Chrysis* (*Tetrachrysis*) *komachi* n. sp.
A-F showing variation of maculation, the dotted areas being green, the hatched areas violet. G, the third segment of abdomen (♀). H and I ditto (♂, variation). J and K, variation of relative length of the antennal joints (♂).

3) *Komachi* is the Japanese meaning "the representative beauty" of a certain district, region or generation, corresponding to the modern usage of *Miss* for instance, Miss Universe, Miss Nippon, etc.

light green, 2nd and 3rd tergites at base broadly deep violet, sometimes sides only of 2nd (and 3rd) maculated. Maculation variable in developmental degree as shown in Fig. Ⅱ, A - F and Table 2. Ventral plates lustreless black, with 1st sternite except margins and 2nd on the anterior half of median line (sometimes also two vaguely outlined maculae) greenish or reddish golden. Structure and scuplture of head and thorax of the present species are very similar to those of the so-called *C. ignita japonica* Mocs., as is in coloration, but in general the variation of characters is much less as compared with that species (Table 1; in *ignita* the values are very variable). Antero-lateral angles of pronotum seen from above more distinctly angulated than in *ignita*; abdomen similar in form to the compared subspecies, postero-lateral angles of 2nd tergite slightly larger than 90°, distinctly angulated at apex, median longitudinal carina of the segment well defined; 3rd segment : Fig. Ⅱ, A & G, with median line gently elevated and sometimes posteriorly distinctly carinated, the disc on each side of the median elevation slightly depressed; ante-apical series of foveae 16 - 24 in number, partly confluent, deep and open, laterally smaller, supra-series somewhat incrassate towards the sides, apical margin short, the teeth short, median pair more widely apart from each other than from the lateral, sinus widely rounded, lateral margins of the segment roundly convergent backward and sinuate before the lateral teeth. General pattern of punctuation on abdomen resembles that of the so-called *ignita japonica*, but the punctures on 2nd and 3rd tergites very much finer and closer, on 3rd especially on apical portion more distinct.

♂. Similar to ♀ not only in general characters but also in variational trend in coloration, but, as usual, 3rd tergite shorter, convex, without median elevation and lateral depression; the teeth sometimes equidistant, sometimes as in ♀ (Fig. Ⅱ, H. I), punctures on abdomen in pattern similar, but comparatively larger, though much finer as compared with *ignita* (so-called var. *japonica*). Genitalia similar to that of the compared species, only slightly differs in having the squama angulated on the inner margin near the middle (in *ignita* the portion rounded).

Holotype : ♀, Fukui Pref. (Katsuyama), 27. V. 1953 (K. Tsuneki leg.)

Allotype : ♂, Fukui Pref. (Monjusan), 18. V. 1953 (K. Tsuneki leg.)

Paratypes : 13 ♀♀ 1 ♂, Fukui Pref. (Katsuyama, Monjusan), 18 - 27. V. 1953 (K. Tsuneki leg.); 1 ♀ 1 ♂, Tochigi Pref. (Oya), 6. VI. 1936, 10. V. 1934 (K. Tsuneki leg.); 1 ♂, Chiba Pref. (Narashino), 29. IV. 1930 (A. Kato leg.); 3 ♀♀ 10 ♂♂, Fukui Pref. (Monjusan), 10 - 15. V. 1954; 1 ♀, Fukui Pref. (Katsuyama), 28. V. 1954; 1 ♀, Mt. Haku (Ichinose), 3. VIII. 1954. (K. Tsuneki leg.) (Types in the writer's Coll.)

Remarks. The coloration of the abdomen, when well developed, is characteristic of the present species. However, when not well developed, the specimens of this species appear to be a certain (alpine or boreal) form of *C. ignita* in which punctuation on abdomen is remarkably fine and close. But the microdistributional state of the present species seems to hold the view that this is not a mere variation of that species. In Fukui Pref., in the districts where *komachi* occurs, *ignita* can also abundantly be collected. However, the

Table 1. Measurements of head, gena, and antenna

No. (Sex)	Relative Value of (Width of Head (A))	(Length of Gena (B))	Ditto (A…100) A : B	Relative Length of Antennal Joints 2 : 3 : 4	Ditto (3 … 100) 2 : 3 : 4
1 (♀)	74.0*	6.5*	100 8.9	8.0* 17.0* 12.0*	47 100 70
2 (♀)	72.0	6.5	100 9.0	7.5 16.5 11.5	46 100 70
3 (♀)	72.0	6.5	100 9.0	7.5 16.0 11.5	47 100 72
4 (♀)	65.0	6.0	100 9.2	7.0 15.0 11.0	47 100 73
5 (♀)	72.0	6.3	100 8.8	7.2 16.0 11.0	45 100 69
6 (♀)	70.0	6.2	100 8.9	7.0 16.0 11.0	44 100 69
7 (♀)	72.0	6.5	100 9.0	7.0 15.5 11.0	45 100 72
8 (♀)	68.0	6.0	100 8.8	7.0 15.5 10.5	45 100 68
9 (♀)	65.0	5.7	100 8.8	6.8 15.0 10.5	46 100 67
10 (♂)	64.0	4.8	100 7.5	6.0 12.0 9.0	50 100 75
11 (♂)	70.0	4.5	100 6.4	7.0 16.0 10.0	44 100 63
12 (♂)	70.0	4.0	100 5.7	7.0 16.0 10.5	47 100 67

* The numerical value 32 corresponds to 1 mm.

latter shows the characters approaching rather *ignita longula* Abeille, having the body larger and slender, the 2nd tergite with coarse, rugosely-arranged punctures at base in the middle and finer and weaker punctures towards apex, and ventral plates coloured black, maculated with reddish golden. Between such form and the present species there can be found no intermediate forms in punctuation.

Table 2. Variation in maculation of abdomen

Sex \ Fig. 1	A	B	C	D	E	F
♂	8	3	0	0	2	1
♀	4	5	2	2	3	2
Total	12	8	2	2	5	3

In ♂, as shown in Table 1, the relative length of the 3rd antennal joint

to the 2nd and 4th fairly remarkably varies with the individual (Fig. I, J & K). But such a fact seems rather insignificant, for similar phenomenon is often met with in the members of the genus *Chrysis*, especially in ♂.

The present species, when the violet maculae on the abdomen are well developed, seems close to *C. galloisi* Buyssn, 1909, described from Karuizawa, Japan. But so far as the original description goes this specics can easily be separated from *galloisi* in the following points : 1) Oculo-mandibular space not short, 2) the 3rd antennal joint is distinctly shorter than the two subsequent joints united, 3) The 3rd segment of the abdomen not noticeably long, 4) apical teeth of abdomen are always not equidistant in ♀. A certain colour form of this species resembles also *C. sarafschana sickmanni* Mocs., but distinguishable therefrom in the form of the squamae of the male genital apparatus (in *komachi* apical summit is slightly deviated towards the outer side, while in *sickmanni* the apex is simply rounded) and in the pattern of maculation on the 2nd abdominal tergite (in *komachi* maculation is developed from the sides toward the middle, while in *sickmanni* it is extended from the middle towards the sides, but always does not reach the lateral margins).

The writer expresses his sincere thanks to Dr. S. Asahina.

3. On **Chrysis daphne** Smith, 1874

Dr. S. Asahina kindly took trouble for the writer with the examination of the type specimen of *Ch. daphne* Smith preserved in the British Museum of Natural History. According to his information it was truly a chrysid having six teeth on the apical margin of the abdomen, just as was previously discussed by the writer. It has finally been determined, therefore, that *daphne* Sm. should be synonymised with *Ch.* (*Hexachrysis*) *fasciata zetterstedti* Dahlbom, 1845 and the Chrysids hitherto believed to be *daphne* should correctly be referred to *Chr.* (*Tetrachr.*) *rubrifasciata* Tsuneki, 1950.

4. The occurrence of **Chrysis** (**Tetrachrysis**) **syrinx** Tsuneki, 1950 in Japan

Only a single example of this species has so far been known from Korea. This summer (1954), nine specimens were captured by the writer at the foot of Mt. Haku, M. Japan, showing that the species was not endemic in Korea.

5 ♀♀, 28 – 31. VII, 4 – 5. VIII., Koike, Fukui Pref.; 4 ♀♀, 2-3. VIII., Ichinose, Ishikawa Pref.

5. The first record of **Omalus auratus** (Linné, 1761) from Honshu

In Japan this species has been known only from Hokkaido. The following

is the first record of the distribution of the species from Honshu :

1 ♀, VI. 1953, Nikko, (E. Tanaka leg. and in the writer's Coll.)

II. TWO NEW SPECIES OF CRABRONINAE (SPHECIDAE)

1. **Ectemnius (Clytochrysus) flavohirtus** sp. nov.

♂. Length 8.5 - 10.0 mm. Body fairly closely covered with long golden yellow pubescence, pubescence on head and thorax longer than the 3rd joint of antennae, on the under sides hoary-white, on coxae, trochanters and femora of legs yellowish white, on tarsi short, uniform in length, very dense and bright testaceous in colour; lower front except the median longitudinal space, clypeus and temples just behind eyes covered with appressed silvery hairs. Black, with bronzy reflection on upper front, vertex, mesonotum, mesopleuron, scutellum and abdominal tergites. Orange yellow : mandibles at base, antennal scapes, pedicels in part, a medianly interrupted broad band on pronotum, humeral angles, antero-dorsal macula on episternum of mesopleuron (in some specimens whitish), a spot on epimeron (sometimes absent), a band on anterior half of scutellum and of postscutellum (sometimes both interrupted in the middle), axillae of scutellum, a large triangular marking on propodeum at base (sometimes with a narrow streak in the middle), a spot on each side of the abdominal tergites 1 (small), 2, 3 and 4, a broad band on 5 (somettmes medianly interrupted) and 6, under side and apical portion of front and mid femora, front tibia except inner surface, mid tibia except base and inner margin and an irregular shaped macula on apical portion of hind tibia. Apical half of mandibles and median space on lower front glittering black, antennal flagella fuscous, beneath testaceous, wing tegulae and tarsi of legs bright testaceous, claws yellowish; remaining portions of legs slightly brownish, wings hyaline, somewhat clouded and with a tint of yellowish, veins and stigma black.

Head from above : Fig. 1. Vertex flattened with a feeble elevation between postocelli, sometimes with a fine faint groove in the middle, the depressions outside the postocelli very slight and indistinct, OOD : POD = 3 : 2, OOD = OCD, ocelli in a curve, similar in size, distinctly outlined, testaceous in colour and strikingly glittering, its diameter slightly more than half as large as POD, frontal median groove in front of anterior ocellus feeble, but gradually distinct anteriorly where the surface gently inclined towards the middle. Head seen in front : Fig. 2, on lower front median glabrous space somewhat gutterwise excavated, antennary sockets in contact with each other as well as with inner margins of eyes. Clypeus : Fig. 7, very thick and gently convex ; mandibles

bidentate at apex, with a strong tooth on inner margin before the middle. Head in profile : Fig. 3, with eye as wide as temple, oculo-mandibular space almost absent; antennae comparatively short and thick, flagellum normal, 1st joint nearly as long as 4 following joints taken together and only slightly less than half the length of flagellum, relative length of joints 3, 4 and 5 approximately 8 : 6 : 5, joint 3 nearly 1.5 times as long as wide at apex, joint 9 slightly wider than long, terminal joint as long as joint 3, slightly spatulate; pronotum similar in form to that of *C. cavifrons* Thomson, well-developed, transverse, with fine median groove, anterior lateral angles rounded, interval between

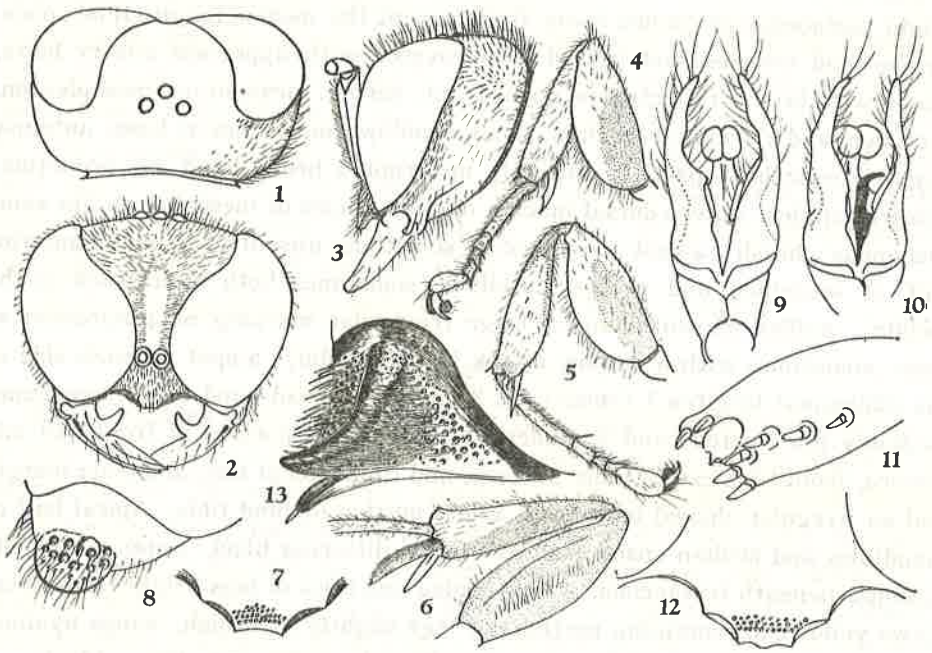

Fig. III. *Ectemnius (Clytochrysus) flavohirtus* sp. nov.

pro- and mesonotum very deeply furrowed, mesonotum wider than long, convex, scutellum convex, half as long as mesonotum, the furrow between the two plates deep but not crenate, on mesopleuron epicnemial carina distinct, epicnemium divided into three parts by two longitudinal carinae, uppermost area smaller, triangular in shape (in *cavifrons* lunate), forming a distinct angle against the middle area, angle between the latter and lowermost area obtuse, episternal suture grooved and crenate below, without elevated ridge in front of mesocoxa; area cordata on propodeum defined by the difference of sculpture, semicircular in form, only anteriorly enclosed by carinae, with fine median

groove which extends to the apex of posterior slope and widened on its upper portion, without separating carina between posterior slope and the sides of the segment. The 1st segment of abdomen as long as wide at apex, the 2nd segment rather abruptly widened, caudal segment provided with pygidial area (Fig. 8). Genitalia : Figs 9 & 10, apex of sagitta remarkably widened. Legs : Figs. 4, 5, 6; front femur wider than in *cavifrons*, front metatarsus shorter than the 4 following joints united (in *cavifrons* longer), mid tibia with characteristic row of spines at apex, hind tibia sparsely spinose. Wing venation similar to that of *cavifrons*, only the cubital cell slightly broader.

Vertex practically impunctate, upper front finely sparsely aciculately punctured, punctures anteriorly closer, clypeus finely densely punctured, mat, mesonotum and scutellum finely moderately closely, mesopleuron more sparsely punctatured, punctures on posterior portion of scutellum and postscutellum larger, base of area cordata on propodeum coarsely crenate, on the area and upper portion of posterior slope somewhat coarsely but shallowly punctate, sides of area cordata rather coarsely, arcuately, rest of posterior slople transversely, sides of the segment longitudinally very finely and closely striate, striae on metapleuron sparser; 1st tergite and sides of 2nd tergite finely sparsely punctured, remaining segments practically impunctate (only microscopical hair-pits definable), pygidial area rather coarsely punctured-subreticulate.

♀. Length 12 mm. Similar to ♂, but in general more robust, differing in the following points : 1) Coloration. Clypeus adorned with 2 large yellow maculae which are broadly confluent in the middle, on upper portion of episternum of mesopleuron an additional yellow spot present, but in the specimen the spot on epimeron lacking, maculae on scutellum, postscutellum, the 1st abdominal segment and femora of legs comparatively larger than in ♂. 2) Structure. Eyes less developed, seen in profile narrower than temple, seen in front similarly convergent below, clypeus : Fig. 12, relative length of antennal joints 1 : 2 + 3 + 4 + 5 = 1 : 1; 3 : 4 : 5 = 9 : 7 : 6; 3 slightly less than twice as long as broad at apex, mandibles tridentate at apex, with a strong tooth on inner margin. Propodeum anteriorly longitudinally, posteriorly transversely striate, the portion of area cordata laterally and posteriorly without striae, sides of the segment longitudinally closely striate. Pygidial area : Fig. 13. Mid tibia with a few spines on onter face (Fig. 11), hind tibia more abundantly spinose than in ♂, the spines reddish in colour. Legs generally more stoutly built, terminal joints of tarsi and pulvilli remarkably large.

Holotype : ♂, Mt. Haku (Ishikawa Pref.), 1. VIII. 1953 (S. Fujii leg.)

Allotype : ♀, The same place and time (leg. K. Tsuneki)

Paratypes : 2 ♂♂, The same place and time (K. Tsuneki et S. Fujii leg.) (Types are in the writer's collection).

2. **Crossocerus (Coelocrabro) tyuzendzianus** sp. nov.

This species is very distinct in the form of the head, the clypeus and the pronotum and by the combination of these characters together with those of the mesopleural tooth and of the area cordata on the propodeum it can easily be distinguished from all the other known species of the subgenus.

♀. Length 4.0 mm, fore wing 3.4 mm. Black, with bronzy reflection on head. Yellow : Mandibles except apex, scape of antennae wholly, pedicel beneath, two spots on pronotum, humeral angles, coxae apicaliy, trochanters, base and apex of femora of all legs, tibiae and tarsi of front and mid legs, base of hind tibiae and basitarsi. Tegulae of wing transparent yellow; antennae brown, beneath light brown, basally yellowish; veins of wings dark brown,

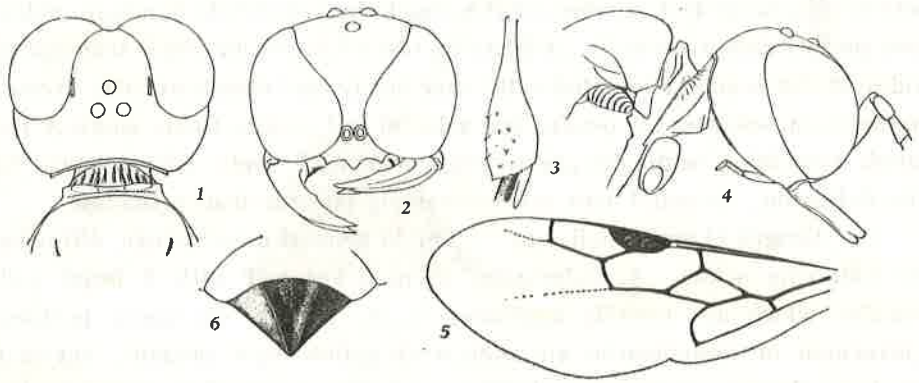

Fig. IV. *Crossocerus (Coelocrabro) tyuzendzianus* sp. nov.

basally and posteriorly paler; apical margin of each abdominal segment testaceous. Clypeus, lower front on the inner margins of eyes and episternum of mesopleuron densely covered with silvery hairs.

Head from above characteristic in form, very thick (Fig. 1), with long slender frontal impressions close to eyes, ocelli in an equilateral triangle, OOD : POD : OCD ≒ 2 : 1 : 4, frontal median furrow distinct, head in front with inner orbits of eyes strongly convergent below, without space between sockets of antennae and between socket and eye (Fig. 2), clypeus short, broad, stoutly tridentate on the anterior margin (Ditto), mandibles bidentate at apex, slightly triangularly produced on the inner margin near the middle (Ditto). Antennal joints 2 (when held vertical to the 1st), 3, 4 and 5 subequal in length, 3 slightly less than twice as long as wide at apex, terminal joint normal. Head in profile :

Fig. 4. Pronotum : Ditto, depressed much below the level of mesonotum, the latter convex, anteriorly rather steeply but roundly sloped (Fig. 4), with parapsidal furrows distinct, scutellum half the length of mesonotum, slightly wider than long, and convex; propodeum with area cordata medianly finely grooved, at base longitudioally shortly and rather coarsely striate and only posteriorly enclosed by the dotted line, posterior surface medianly deeply furrowed and only apically provided with lateral carinae. Prosternal tubercles conical, rather pointed at apex, mesopleuron with well-defined tooth, side of propodeum below longitudinally broadly excavated. Legs normal, each leg with metatarsus subequal in length to the remaining apical joints united; hind tibiae similar in form to that of *C. pubescens*, with outer surface strongly spinose (Fig. 3), the following metatarsi not particularly incrassate. Venation of forewing : Fig. 5. The 1st segment of abdomen longer than wide at apex (ratio 5 : 4), at base above broadly deeply grooved; pygidial area : Fig. 6, at base in the middle roundly elevated with surface granulate. Head impunctate, highly polished, with very fine points very sparsely scattered on upper front; pronotum with anterior vertical surface very finely irregularly sculptured, neck longitudinally striated, mesonotum anteriorly finely, moderately closely punctured, but laterally and posteriorly punctures sparser, mesopleuron without puncture, polished, scutellum with sparse fine points anterirly, propodeum polished, only having a few weak transverse striae on the posterior surface toward apex. Abdomen impunctate, apical two segments with sparse fine and feeble punctures scattered.

♂, unknown.

Holotype : ♀, Shobugahama, Tyuzendzi, Nikko, 10. VIII. 1954 (K. Tsuneki leg. and in his coll).

Remarks. This example was captured when she came back empty-handed to her nest. It was made in the abandoned burrow of a boring beetle found on the dead tree trunk standing in the dense woods near the Ryuzu-falls.

III. A NEW SPECIES AND THE UNRECORDED MALE OF A SPECIES OF THE GENUS *STIGMUS* (SPHECIDAE, PEMPHREDONINAE)

1. **Stigmus (Stigmus) quadriceps** sp. nov.

♀. Length 4.7 - 5.8 mm, forewing 4.0 - 4.9 mm. Black with bronzy reflection on head and thorax. Mandibles yellow except blackish apex and testaceous inner margin; palpi and humeral angles yellowish white, the latter anteriorly brownish, with dense fringe of short white hairs on the posterior

margin; labrum, antennae except dark brownish upper side (sometimes this area adorned with pale brownish ring at base of each joint), teglae of wings, apex of coxae, trochanters wholly, base and apex of femora, tibiae and tarsi of all legs testaceous yellow, remaining portions of legs blackish or dark brown, sometimes the greater part of hind tibiae brownish and sometimes front and mid femora broadly testaceous yellow. Stigma of wings brownish black, veins dark brown, basally turning into yellowish, apical margin of each abdominal segment and caudal segment wholly testaceous, in some specimens ventral surface of abdomen posteriorly broadly testaceous. Testaceous portions lustrous and semitransparent. Body almost glabrous, inner margins of eyes rather broadly fairly densely covered with short whitish pubescence, anterior margin of clypeus and mandibles throughout provided with long testaceous hairs, apical abdominal segment also somewhat hairy.

Head seen from above very thick, ratio of width to length (in the middle) 37 : 26 (average of 6 specimens, variation slight), temples well developed, with lateral margins sometimes gently convergent backward directly from behind eyes (Fig. 1), sometimes running parallel for a short distance behind eyes and then roundly convergent backward (Fig. 2), ocelli in an isosceles triangle, only slightly wider at base than high, OOD : POD : OCD ≒ 3 : 1 : 5, ocellar depressions somewhat remarkable on the outsides of postocelli, always with a median short feeble longitudinal groove on posterior portion of vertex, frontal impression represented by a patch of striae located on culocellar line, closer to eye, variable in form and size, upper front developed, as a rule without median furrow. Head seen in front : Fig. 3, lower front longitudinally broadly hollowed, the hollow gently congergent above and opening downward, clypeus short, gently convex, rather bluntly bidentate on the apical margin, sinus rounded (Ditto), labrum usually produced from beneath clypeus, bluntly quadridentate, median pair more advanced (Ditto). Head seen in profile : Fig. 4; antennae slender, long, with joint 1 subequal in length to the following 3 joints taken together, joint 2, 3 and 4 subequal in length to each other, joint 3 slightly more than twice as long as wide at apex, terminal joint somewhat longer than joint 3 and in form normal. Pronotum very short in the middle, with anterior margin ridged, the ridge seen in front gently convex, with upper lateral corner roundly angulated, mesonotum with lateral furrows of anterior trisulci deep, rather short, attaining to about one-fourth of mesonotal length, median furrow not impressed, represented only by two fine feeble grooves which are longer, extending to about the middle of the segment, parapsidal furrows well defined, feebly crenulate, without striae on posterior margin,

lateral furrows and scuto-scutellar furrows crenulate; mesopleuron with triangular area enclosed by well-defined crenate furrows which are in some specimens broad, in others narrow, the area variable in form, either

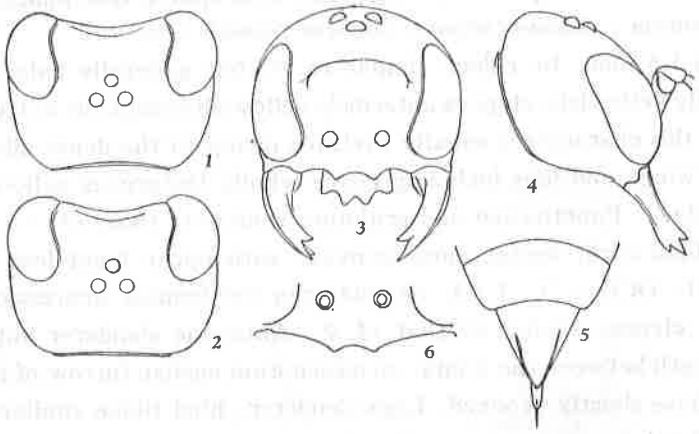

Fig. V. *Stigmus* (*Stigmus*) *quadriceps* sp. nov.

subtriangular, irregular quadrilateral or subrounded. Propodeum always with a comparatively large oval, slightly depressed area at base above (corresponding to area cordata), which is enclosed by the carinae and provided with a median irregularly sinuate carina together with several short branches; petiole of abdomen subepual in length to the 1st tergite, slightly thicker posteriorly, about thrice as long as wide at apex, pygidial area : Fig. 5 (fairly uniform in all the types), distinctly marginated by the carinae. Hind tibiae provided with 2 or 3 rather long spines on the outer surface.

Body highly polished. Head practically impunctate, in some specimens vertex posteriorly and temples above with fine and shallow punctures very sparsely scattered, pronotum longitudinally coarsely striate, anterior vertical surface finely coriaceous, sometimes provided with longitudinal striae, mesonotum very sparsely scattered with shallow fine points, scutellum impunctate, mesopleuron with triangular area usually only vely minutery irregularly sculptured and mat, sometimes nearly polished and sometimes with longitudinal weak striae, upper area always finely closely longitudinally striate, in some specimens posterior portion of epimeron also with weak fine striae; postscutellum lustreless, sometimes with very fine oblique striae; propodeum on outsides of area cordata coarsely reticulate, usually the meshes obliquely elongate near area cordata, appearing in some specimens obliquely striated, the network extends laterally to the upper portion of the sides of the segment where remaining part finely

rugulose, but without sculpture anteriorly. In general the sculpture of propodeum considerably variable not only in coarseness, but also in strength. Petiole of abdomen longitudinally stiate, with anterior half finely rugose-striate or rugose-reticulate. Apical two segments with sparse fine punctures.

♂. Synonym : *Stigmus* (*Stigmus*) *japonicus* Tsuneki, 1954, ♂.

Length 4.5 mm. In colour similar to ♀, but generally paler. Antennae more broadly yellowish, clypeus anteriorly yellowish except the extreme margin (constant? this character is usually invisible owing to the dense silvery piles), tegulae of wings and legs including coxae wholly testaceous yellow, abdomen brownish black. Punctuation and sculpture similar to those of ♀. Head more narrowed backward, vertex more convex, with upper front less developed, OOD : POD : OCD ≒ 3 : 1 : 4, opaque area (or frontal impression) distinct but small, clypeus similar to that of ♀. Antennae slenderer but similar in relative length between the joints, on mesonotum median furrow of the anterior trisulci at base shortly grooved. Legs slenderer, hind tibiae similarly provided with 2 or 3 spines.

Holotype : ♀, Koike (about 1000 m high), Fukui Pref. Japan, 31. VII. 1954.

Allotype : ♂, collected with the Holotype.

Paratypes : 2 ♀♀, Tyuzendzi. Nikko, 24. VII. 1954 (E. Tanaka leg.); 10 ♀♀. 28. VII. – 5. VIII. 1954, Koike, Fukui Pref.; 1 ♂, Jozankei, Hokkaido, 25. VI. 1952; I ♂, Iwate Pref. date unknown (Ogasawara leg., Coll. Hokkido University) (Unless otherwise described the specimens were collected by K. Tsuneki and in his collection)

Remarks. 1) The female of the present species can easily be distinguished from other known Palaearctic species of the genus by inserting the following lines between 14 and 15 of the key published previously by the writer :

14' Clypeus only slightly more than as long in the middle as wide between the teeth on the anterior margin. Japan (Hokkaido and Honshu) *quadriceps* Tsuneki, 1954

– Clypeus distinctly more than twice as long in the middle as wide between the teeth on the anterior margin 15

2) In his previous paper the writer described the male of *S. japonicus* Tsuneki basing on two specimens from Hokkaido and Honshu (Iwate Pref.). According to the knowledge at present they should be transferred to the present species. Thus the true male of *S. japonicus* has become to be searched hereafter.

2. Stigmus (Stigmus) convergens Tsuneki ♂

This summer (1954) the writer could collect a number of the specimens

of this species at Koike, Fukui Pref. (38 ♀♀ 11 ♂♂) and Shobugahama, Tyuzendzi, Nikko (1 ♀) together with those of *S. munakatai* (3 ♀♀). The fact was beyond his expectation, since it has been considered that the members of the subgenus *Stigmus* occur very rarely in nature. Anyhow, owing to such

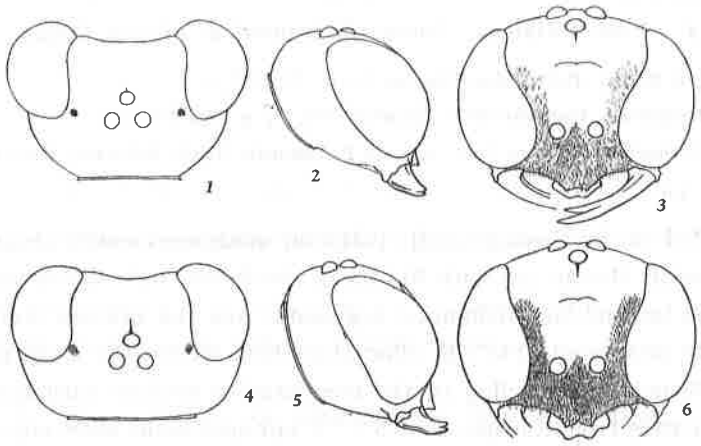

Fig. VI. *Stigmus* (*Stigmus*) *convergens* Tsuneki ♂ (1, 2 and 3) and *Stigmus* (*Stigmus*) *flavicornis* Tsuneki ♂ (4, 5 and 6)

a plenty material the sexual combination of the present species, in relation to the problem concerning *S. flavicornis*, could finally be settled. According to the investigations, although the males of both the species resemble very closely to each other as have been supposed, yet they differ so markedly in the form of the head that they can not be regarded as belonging to the same species.

In *convergens* ♂ the head is much more narrowed backward than in *flavicornis* ♂, as shown in Figs. 1 and 4; lateral and frontal views are also different : Figs 2 and 5, and 3 and 6. On the mesopleuron, so far as the examined specimens go, not only the triangular area, but also the area above it is smooth and polished. Posterior slope of the propodeum is not so steep as in *flavicornis*. The form of the labrum is also different (Figs. 3 and 6), moreover the pubescence on the antennal flagellum is longer in *flavicornis* than in the present species; legs of *convergens* are nearly entirely testaceous, except coxae and hind femora in some specimens.

♂. Similar to ♀ in general characters, but smaller (3.2 - 3.7 mm), and slenderer with legs more broadly testaceous, with head more strikingly convergent backward.

Allotype : ♂, Koike, Fukui Pref , 28. VII, 1954 (K. Tsuneki leg.)

Paratypes : 10♂♂, collected with the allotype (K. Tsuneki leg. Types in his collection)

IV. NOTES ON *PSEN* (*MIMESA*) AND *PSEN* (*MIMUMESA*) OF JAPAN

The following notes will throw some lights on the Psenini-fauna of Japan, the study of which has still remained in its infancy :

1. Psen (Mimesa) shuckardi japnonicus (Pérez, 1905)

Mimasa japonica Pérez, Bull. Mus. Paris; 11, p. 150, 1905

Psen (*Aporia*) *japonicus* Gussakovskij, Mushi, VII, 2, p. 82, 1934.

Psen (*Mimesa*) *shuckardi* Wesm. var. *japonica* Beaumont, Mitt. Schweiz. Ent. Ges., XVII, 1 - 2, p. 65, 1937.

As pointed out by Gussakovskij (1934) our specimens exibit close affinities in morphological characters with European *shuckardi*, only differing from it in colour of the 1st and 2nd abdominal segments, and the present writer agrees with Prof. de Beaumont (1937) in allocating them within the specific range of *shuchardi* Wesmael. According to the comparative studies with specimens of the nominate race from Europe (5♀♀5♂♂), our specimens show the inclination of having the abdominal petiole longer (in most specimens nearly as long as the hind femur) and the sculpture on the area cordata more regular (less rugose). In some specimens the sides of the 1st abdominal segment are somewhat reddish in colour, probably representing a sign toward the colour variation.

Specimens examined : 5 ♀♀ 1 ♂, Hokkaido (Sapporo and Jozankei), 24. VII. - 12. IX. 1945 - 51 (K. Tsuneki leg.); 12 ♀♀ 9 ♂♂, Honshu (Tyuzendzi, Nikko and at the foot of Mt. Haku, both more than 1000 m high), 27. VII. 1936, 12. VIII. 1954 (K. Tsuneki and E. Tanaka leg.)

Biology : This subspecies, as in the nominate race, is the burrower of the ground. In Tyuzendzi, Nikko, the wasps are most frepuent on the roadsides at Nanamagari, near the Ryuzu Falls. There they live in small colonies on the pebbly roadside ground and carry in their burrows small hoppers (chiefly the nymphs) belonging to Jassidae.

2. Psen (Mimumesa) dahlbomi (Wesmael, 1852)

Mimesa dahlbomi Gussakovskij, Ark. Zool., 24 A, 10, p. 5, 1933; Mushi, VII, 2, p. 82, 1934. (Saghalien)

Psen (*Mimumesa*) *dahlbomi* de Beaumont, Mitt. Schweiz. Ent. Ges., XVII, 1 - 2, p. 51, 1937; —— van Lith, Tijdschr. Ent., 91 (1948), pp. 138, 139, 140 and 146, 1949.

Mimesa (*Mimumesa*) *dahlbomi* Spooner, Trans. Ent. Soc. Lond., 99 (3), p. 159, 1948.

In comparison with a female specimen from Europe, the specimens collected

in Japan seems to differ only in having a bronzy shimmer on the head and thorax, and in the punctuation on the areas generally finer and sparser, sometimes the occiput lacking the striae.

Specimens examined : 8 ♀♀ 1 ♂, Hokkaido (Jozankei, 2 ♀♀, 29. VI; 1 ♀, 7. VII; 5 ♀♀ 1 ♂, 10 - 24. IX. 1945 - 52. K. Tsuneki leg.); 3 ♀♀ 1 ♂, Honshu (Tyuzendzi, 28 VIII, 1952, E. Tanaka leg.).

Biology : The wasp of this species nests in the decayed wood of dead trees and stored the brood-chambers with leafhoppers belonging to Jassidae.

3. Psen (Mimumesa) beaumonti Lith (1949)

Psen (Mimumesa) beaumonti van Lith, Tijdschr. Ent., 91 (1948), pp. 138, 139, 140 and 146, 1949.

Specimens examined : 6 ♀♀, Hokkaido (1 ♀, Sapporo, 20. IX. 1947; 5 ♀♀, Atsubetsu near Sapporo, 30. IX. 1947, K. Tsuneki leg.)

4. Psen (Mimumesa) atratinus (F. Morawitz, 1891)

Mimesa atratina F. Morawitz, Hor. Soc. Ent. Ross , 25, p. 206, 1891, ♂. (de Beaumont, Mitt. Schweiz. Ent. Ges., XVII. 1 - 2, p. 52, 1937)

Psen (Mimumesa) belgicus de Beaumont, loc. cit., p. 53.

Mimesa (Mimumesa) atratina Spooner, Trans. Ent. Soc. London, 99 (3), pp. 157, 158 and 166, 1948.

? *Mimesa longula* Gussakovskij, Ark. f. Zool., 24 A, 10, p. 5, 1933.

Psen (Mimumesa) atratinus van Lith, Tijds. Ent., 91 (1948), pp. 141, 143, 146, 1949.

The specimens listed below well agree in characters with a specimen from Europe (det. J. P. van Lith) excepting that the abdominal petiole is comparatively narrower (relative length to width at apex: in the European specimen 40 : 11, in ours 40 : 9, but the relative length to hind tibia is similar, 1 : 1), the lateral irregular sculpture on its upper surface is much feebler (nearly smooth), and the punctuation on the head and mesonotum finer and sparser, with the surface more shining and with somewhat bronzy reflection in certain light.

Specimens examined : 3 ♀♀, Hokkaido (Sapporo, 4. IX. 1945, K. Tsuneki leg.) : 2 ♀♀, Honshu (1 ♀, Aomori Pref., 19. VIII. 1950, R. Narumi leg.; 1 ♀, Katsuyama, Fukui pref., 26. VIII. 1954, K. Tsuneki leg.).

5. Psen (Mimumesa) littoralis (Bondroit, 1933)

Psen (mimesa) fulvitarsis Gussakovskij, Mushi, VII. 2. p. 82, 1934; Trav. Inst. zool. Acad. Sc. U. R. S. S., 4. p. 663.

Mimesa (*Mimumesa*) *celtica* Spooner, Trans. Ent. Soc. London, 99 pp. 157, 159 and 164, 1948.
Psen (*Mimumesa*) *littoralis* van Lith, Tijds. Ent., 91 (1948), p. 145, 1949.

The specimens from Japan (= *fulvitarsis* Gussakovskij) agree well in characters of the general structure of the body including the male genitalia, general punctuation and coloration with the descriptions of the European examples (Bondroit 1933, Spooner 1948 including *celtica*, particularly van Lith 1949) with the exception that the antennal joints in the male carinated as far as joint 11, sometimes joint 12 also carries a small spot. In view of this character they seem to agree with *unicolor* v. d. Linden, as supposed by Beaumont (1941). But the direct comparison with the European specimens of *unicolor* ♀♂ (van Lith det.) shows that this is not the case. They do not belong also to *spooneri*, as clearly shown by the difference of the structure of the male genitalia. J. P. van Lith already suggested the synonymy between *fulvitarsis* and *littoralis* (1949). Taking into consideration the facts that the carinae on joints 11 and 12 are very small and that the carination on distal portion is somewhat variable with the individual, the writer takes our specimens as representing a variety of *littolaris* Bondroit, without giving the final determination whether or not they merit a subspecies. Our male specimens are provided on the thorax beneath with long whitish pubescence as in *unicolor*, and the coloration of the legs is similar in the male to the compared species, but much paler and yellowish in the female. (Descriptions from the Honshu specimens).

Specimens : 1 ♀, Hokkaido (Sapporo, 3. VII. 1944); 4 ♀♀ 4 ♂♂ Honshu (1 ♀ 4 ♂♂, Sabae, Fukui Pref., 11. VI. 1954; 3 ♀♀, Katsuyama, Fukui Pref., 23. IX. 1954, K. Tsuneki leg.)

V. THE TRUE MALE OF *PEMPHREDON FLAVISTIGMA* THOMSON

As previously referred to by the writer in his treatise on the biology of the Japanese Pemphredonids (1952), the sexual combination of *Pemphredon* (s. str.) *flavistigma* Thomson, prevailed since the publication of a paper by Merisuo (1936), has been clarified to be an error as a result of rearing the larvae.

The true male of this species is the male hitherto regarded as representing *P.* (s. str.) *montanus* Dahlbom, and probably vice versa. That is to say, the male specimens having a rounded incision on the anterior margin in the middle of the clypeus (Merisuo, 1936, Fig. 2, a, and Tsuneki, 1951, Fig. 5, F and G) are probably the males of *P. montanus* Dahlbom.