

**The Genus *Crossocerus* Lepeletier et Brullé (1834)
of Japan, Korea, Saghalien and the Kuriles**

By Katsuji TSUNAKI
(Biological Laboratory, Fukui University)

Reprinted from the Memoirs of the
Faculty of Liberal Arts, Fukui University
Series II, Natural Science, No. 3, pp. 57-78
June 25, 1954 *ls*

FUKUI, JAPAN

**The Genus *Crossocerus* Lepeletier et Brullé (1834)
of Japan, Korea, Saghalien and the Kuriles
(Hymenoptera, Sphecidae, Crabroninae)***

by Katsuji TSUNEKI

(Biological Laboratory, Fukui University)

***Crossocerus* Lepeletier et Brullé, 1834**

Grabro (*Crossocerus* + *Coelocrabro* + *Hoplocrabro* + *Blepharipus* + *Cuphopterus*) Kohl, F. F., 1915; — Berland, L., 1925.

Crossocerus + *Coelocrabro* + *Ablepharipus* + *Blepharipus* + *Acanthocrabro* + *Hoplocrabro* Richards, O. W., 1937.

Crossocerus Pate, V. S. L., 1944; — Leclercq, J., 1949, 50, 51.

I. KEY TO THE SPECIES

♂ ♂

- | | | |
|---|---|---|
| 1 | Abdominal tergites with yellow or white maculae | 2 |
| - | Abdominal tergites without maculae | 8 |
| 2 | Maculae on abdomen whitish | 3 |
| - | Maculae on abdomen yellow | 5 |
| 3 | Legs normal (Face adorned with a yellow streak along the inner margins of eyes, clypeus triangular, yellow; abdomen maculated on each side of the segment 2, sometimes also on 3 and 4; usually, however, abdomen immaculate). Length 5.0 - 6.7 mm — Hokkaido, Honshu (Nikko), the Ussuri region and Europe | |
| | (<i>Coelocrabro</i>) ^W <i>Walkeri</i> (Shuckard, 1837) | |
| - | Legs remarkably modified | 4 |
| 4 | Hind tibiae armed with two hook-shaped spines at apex, one of the tibial spurs very long, approximately two-thirds as long as the following metatarsus, the 3rd abdominal segment without maculae. Length 8.3 - 9.5 mm — Saghalien, (the Ussuri region ? | |

* Contribution No. 3, from the Biological Laboratory, Fukui University, Fukui, Japan.
Mem. Fac. Lib. Arts, Fukui Univ., Ser. II, Nat. Sci., No. 3, 1954.

— Gussakovskij, 1933), the Kuriles, Hokkaido, Honshu, Shikoku and Kyushu.

(*Blepharipus*) *monstrosus suzukii* (Matsumura, 1912)¹⁾

Hind tibiae without hook-shaped spines at apex, the tibial spurs not particularly long, rather lamellate; 3rd abdominal segment adorned with maculae (Coxal process of hind legs subtrapeziform, its postero-apical angle sharply pointed, with apical border slightly, roundly reflected inwards). Length 9.0 mm (Figs, 31 - 34)

— Honshu (Mt. Haku)

(*Blepharipus*) *hakusanus* Tsuneki, 1954

5 The 1st abdominal segment approximately as long as broad at apex; at least the 2nd abdominal segment adorned with yellow maculae as a rule (Front femora and tibiae nearly normal, front trochanters beneath keeled and sometimes slightly produced on the apical portion, front metatarsi beneath obliquely grooved and densely pilose; mid metatarsi provided with very thick spines at apex, hind coxae not dentate beneath, the 7th sternite of abdomen with a pair of teeth and a median short keel). Length 6.2 - 9.5 mm — Saghalien, Hokkaido, Honshu, Shikoku and Korea

(*Acanthocrabro*) *vagabundus yamatonicus* (Tsuneki, 1947)²⁾

The 1st abdominal segment longer than wide at apex, the 2nd segment of abdomen immaculated 6

6 Legs simple (Mandibles not modified, bifid at apex, without tooth on the inner margin toward the middle, antennal flagella beneath fringed with erect hairs, apical joint normal, vertex broadly depressed without median elevation, mesopleural tooth absent, area cordata enclosed by the groove, the 7th sternite of abdomen normal, the 3rd tergite adorned with yellow maculae). Length 10.7 - 11.0 mm — Hokkaido, Honshu (Nikko, Kamikochi and Sasayama), Shikoku and Korea

(*Ainocrabro*) *aino* (Tsuneki, 1947)

Legs remarkably modified 7

1) The typical form occurs in the Ural region. It differs from our subspecies in maculation, especially in its coloration.

2) The nominate form is widely distributed over Europe, Mongolia, Kashmir and Siberia as far east as the Ussuri region. The present subspecies is distinguishable from it in lacking the spine on front femora beneath at base (Fig. 24, a and b). In the Korean examples the spine is very short, indicating an intermediate state between the two forms.

- 7 Upper front rather angularly bordered in front (Fig. 23), front trochanters beneath with subquadrate lamellate appendage (Fig. 17). (Coxal projection of hind legs triangular, narrow, small, pointed at apex (Fig. 18), mesopleural tooth well-defined, abdomen with lateral markings on the tergites 3 and 4, sometimes also on 1 and a basal marking on pygidial area; see Figs 16 & 19). Length 8.2 - 9.5 mm — Hokkaido, Shikoku and Korea
(*Blepharipus*) *yanoi* (Tsuneki, 1947)
- Upper front rather roundly bordered in front, front trochanters beneath keeled, only roundly projecting on the basal portion (Coxal process of hind legs triangular, broad, large, dilated and obtuse at apex, the 1st tergite of abdomen with an apical yellow band which is medianly interrupted and lengthened longitudinally at sides, tergite 3 with two lateral spots, tergites 6 and 7 also maculated). Length 7.0 - 8.5 mm — Saghalien, the Kuriles, Hokkaido, Honshu (northern parts and high altitude) and Korea
(*Blepharipus*) *dimidiatus sapporoensis* (Kohl, 1915)³⁾
- 8 Thorax beneath covered with long whitish pubescence, mandibles provided with a tooth on the inner margin near the middle, mesopleural tooth present — (subgenus *Ablepharipus*) 9
- Thorax beneath not covered with long whitish pubescence, mandibles without a tooth on the inner margin near the middle, mesopleural tooth either present or lacking 12
- 9 Head beneath without long whitish pubescence; mid femur and tibia incrassate, the latter markedly shorter than the former and broadly truncate at apex, without tibial spur, the following metatarsus slightly crooked (Usually the end of occipital carina abruptly terminated and angulated, humeral angles and outer margin of mid tibiae yellow). Length 5.2 - 6.0 mm — Europe, Algeria, Korea and Saghalien
(*Ablepharipus*) *podagricus* (Vander Linden, 1892)⁴⁾
- Head beneath with long whitish pubescence; mid tibia normal and provided with apical spur, the following metatarsus not crooked (Usually the end of occipital carina gradually terminated) ... 10

3) The original race is known to occur in Europe. Our subspecies differs from it in having the legs and abdomen much less maculated.

4) The male of this species has not been discovered in our region. In one female example from Korea the occipital carina gradually terminated at its ends.

- 10 Length 4.0 - 5.5 mm. Head from above nearly square, the furrow between mesonotum and scutellum not crenate, upper portion of propodeum seen from above subtriangular, nearly flattened, with lateral borders sharply edged, the sides of the segment just below the edges markedly excavated, metapleuro-propodeal suture not grooved (Clypeus with median produced portion apically truncate, and lateral teeth distinct, area cordata on propodeum not enclosed by the groove). Length 3.5 - 5.3 mm — Japan (Honshu, Hokkaido), Saghalien and the Kuriles
(*Ablepharipus*) *shibuyai* (Iwata, 1934)
- Length 5.5 - 7.0 mm. Head from above rather transverse (ratio approximately 8 : 5), the furrow between mesonotum and scutellum distinctly crenate, upper portion of propodeum seen from above rounded, lateral borders not particularly edged, the sides of the segment not excavated, metapleuro-propodeal suture on its upper one-third deeply grooved (Clypeus with median produced portion slightly rounded, its lateral teeth not strong) ... 11
- 11 Humeral angles and mid tibiae except the basal ring black (Area cordata on propodeum enclosed by the groove which is not so strong as in *podagricus*). Length 5.7 - 6.0 mm — Europe, Hokkaido, the Kuriles and Honshu
(*Ablepharipus*) *assimilis* (Smith, 1856)
(= *tirolensis* Kohl, 1877)
- Humeral angles and mid tibiae on its outer surface yellow (Area cordata either enclosed by the feeble groove or the groove is completely lacking). Length 5.4 mm — Europe, Hokkaido and Honshu (Nikko and Hakusan)
(*Ablepharipus*) *congener* (Dahlbom, 1845)⁵⁾
- 12 Caudal tergite not more strongly punctured than the preceding tergite — (subgenus *Coelocrabro*) 13
- Caudal tergite distinctly more strongly punctured than the preceding tergite — (subgenus *Crossocerus*) 25
- 13 Front trochanters, femora and tibiae beneath covered with

5) According to the literature, the differences between the characters ascribed to *C. assimilis* and *congener* in the female specimens seem to be those relating only to the body dimensions and maculation. In the light of evidences obtained from a series of specimens at hand (many ♀ ♂ from Japan), both seem to vary considerably within a species. Probably *congener* represents a certain phase of variation of *assimilis*.

- long hairs (Figs. 10, 11) (Area cordata enclosed by the crenate groove, the 1st tergite longer than broad at apex, body entirely black with the exception of whitish basal 4 tarsal joints of front and mid legs and brownish streak on front femora and tibiae). Length 6.8 - 8.3 mm — Europe, Saghalien, the Kuriles, Hokkaido, Honshu and the Loochoos (Yakushima Island)
- (*Coelocrabro*) **barbipes** (Dahlbom, 1845)
- 14 Front trochanters, femora and tibiae without the fringe of long hairs 14
- 14 Front tibiae and the following metatarsi dilated and remarkably expanded, lobiform (Fig. 1) (Body entirely and legs for the most part black, terminal antennal joints truncate at apex (Fig. 2), mesopleural tooth present, area cordata not enclosed by the crenate groove). Length 6.5 - 8.2 mm — Europe, the Ussuri region, Saghalien, the Kurile Islands, Hokkaido and Honshu
- (*Coelocrabro*) **cetratus** (Shuckard, 1837)
- 15 Front tibiae normal, when slightly dilated the expansion not so much as to be called lobiform 15
- 15 Front metatarsi dilated and expanded 16
- 16 Front metatarsi not dilated, normal 17
- 16 Front metatarsi broadly dilated and remarkably expanded, fan-shaped (Fig. 27), area cordata (well-defined) polished, terminal antennal joints normal (Mandibles and antennal scapes in part, tarsi of legs wholly and tibiae partly yellow). Length 6.2 mm — Hokkaido and Saghalien
- (*Coelocrabro*) **ambiguus hokkaidoensis** Tsuneki, 1954⁶⁾
- 17 Dilatation of front metatarsi only slight, not fan-shaped (Fig. 30), area cordata (well enclosed by the groove) not polished, usually finely striate or rugulose; terminal antennal joints truncate at apex (Entirely black, excepting some tarsal joints). Length 6.3 - 6.8 mm — Europe, the Ussuri region, Saghalien and Hokkaido (Sounkyo)
- (*Coelocrabro*) **leucostomus** (Linné, 1758)
- (= *carbonarius* Dahlbom, 1838)
- 17 Area cordata on propodeum completely enclosed by the crenate

6) This subspecies differs from the nominate race in having the occipital carina not prouced into a tooth at its extremities, but gradually terminated. The typical form is known from Europe and North America.

- groove 18
- Area cordata not or not completely enclosed by the crenate groove 19
- 18 The 7th sternite of abdomen armed with a pair of teeth and a median longitudinal elevation (Pronotum constricted at sides in the middle (Fig. 14), clypeus broadly produced and bluntly tridentate at apex, ocellar region somewhat depressed, clypeus and face entirely black). Length 6.3 - 8.0 mm — The Amur and the Ussuri regions, Korea, Hokkaido (Jozankei and Hakodate), the Kuriles and Honshu (Nikko, Hakusan)
(*Coelocrabro*) *amurensis* (Kohl, 1892)
- The 7th sternite simple (Pronotum rounded at sides, clypeus triangular, yellow, ocellar region not depressed, face with yellow maculae along the inner margins of eyes, sometimes abdomen carries whitish maculae). Length 5.0 - 6.7 mm — Europe, the Ussuri region, Hokkaido and Honshu (Nikko)
(*Coelocrabro*) *walkeri* (Shuckard, 1837)
- 19 Hind tibiae remarkably clavate and the following metatarsi strongly incrassate 20
- Hind tibiae not strongly clavate and the following metatarsi not noticeably incrassate 23
- 20 Hind tibiae spinose, distal antennal joints subtruncate at apex (Mesopleuron without tooth in front of mid coxae, posterior aspect of propodeum separated from sides of the segment by the carinae only on the posterior portion) 21
- Hind tibiae not armed with spines, terminal antennal joints normal 22
- 21 Antennal flagella beneath feebly carinate, tibial spurs and metatarsi of all legs yellowish white. Length 5.7 - 7.0 mm, (Figs. 35 - 43) — Honshu (Nikko)
(*Coelocrabro*) *nikkoensis* Tsuneki et Tanaka, 1954
- Antennal flagella not carinate beneath, tibial spurs and metatarsi of all legs dark brown. Length 5.7 mm — The Ussuri region and the Kuriles
(*Coelocrabro*) *pauxillus* (Gussakovskij, 1933)
(= *sugiharai* Iwata, 1938)
- 22 Clypeus : Fig. 4. (Legs black except for the basal ring of hind tibiae). Length 5.2 - 7.3 mm — Europe, Korea, Hokkaido

- and Honshu (Kurobe valley and Nikko)
 (Coelocrabro) *cinxius* (Dahlbom, 1838)
- Clypeus : Fig. 5. (Front and mid tarsi, front tibiae anteriorly, basal ring of hind- (sometimes also mid-) tibiae yellow). Length 5.0 - 7.3 mm — Europe, Hokkaido, Honshu, Kyushu and Shikoku
 (Coelocrabro) *capitosus* (Shuckard, 1837)
- 23 Head and thorax covered with fairly long pubescence, distal joints of antennae not subtruncate at apex. (Mesopleuron with or without the short tooth in front of the mid coxae, area cordata sometimes accompanied posteriorly with incomplete furrow). Length 6.0 - 7.5 mm — Europe, Hokkaido, the Kuriles and Honshu
 (Coelocrabro) *pubescens* (Shuckard, 1837)
- Head and thorax covered with very short pubescence, distal joints of antennae subtruncate at apex 24
- 24 Clypeus triangularly produced in front (Fig. 22), mesopleura without the tooth in front of mid coxae, posterior surface of propodeum without lateral carinae, greater part of front and mid legs, basal ring of hind tibiae and basal portion of hind tarsi yellow. Length 5.0 - 6.5 mm — Hokkaido (Sapporo and Jozankei) and Honshu (Nasu)
 (Coelocrabro) *flavitarsus* (Tsuneki, 1947)
- Clypeus bluntly tridentate apically in the middle, greater part of all legs black (Mesopleura with a small tooth in front of mid coxae, posterior slope of propodeum separated from the sides of the segment by the well-defined carina, mesonotum with somewhat bronzy reflection). Length 5.0 - 6.0 mm — Europe, Saghalien and Honshu (Nikko and Hakusan)
 (Coelocrabro) *hydenii* (Kohl, 1880)
- 25 Front metatarsi dilated and expanded 26
- Front metatarsi normal 27
- 26 Metatarsal expansion remarkable, fan-shaped (Fig. 28), mesopleural tooth distinct (Front femora and tibiae also somewhat dilated, area cordata enclosed by the crenate groove, the surface finely striate, pronotal and scutellar maculae present, sometimes humeral angles yellow, the 3rd abdominal sternite and partly the 4th also yellow). Length 5.0 - 6.5 mm — Europe, Korea and Honshu (Kamikochi — after Iwata, 1933)
 (Crossocerus) *tarsatus* (Shuckard, 1837)

- (= *palmipes* auctt., nec Linné, 1767)
- Metatarsal dilatation of front legs only slight (Fig. 29) (Also femora and tibiae of front legs somewhat expanded, area cordata enclosed by the crenate groove, the surface finely striate, mesopleural tooth present but short, two spots or a band on pronotum, a large macula on scutellum yellow). Length 5.0 - 6.0 mm — Europe, Algeria, Saghalien, the Kuriles, Hokkaido and Honshu (Kiso — Mt. Koma)
- (*Crossocerus*) **varus** (Lepelletier et Brullé, 1834)
(= *varius* auctt.)
- 27 Mid femora beneath at base with a strong spine (Fig. 12) (Area cordata enclosed by the crenate furrow; mandibles, palpi, scape of antennae in front and legs broadly yellow). Length 4.7 - 5.5 mm — Europe, Algeria, North Manchuria, Korea, Honshu and Hokkaido
- (*Crossocerus*) **denticrus** (Herrich-Schaeffer, 1841)
- Mid femora beneath at base unarmed 28
- 28 The 5th abdominal sternite with a deep bell-shaped emargination apically in the middle (Fig. 25) (Pronotum not strongly developed, area cordata enclosed by the crenate groove, the surface variably striate, mesonotum distinctly closely punctured, end segment of abdomen truncate at apex, frontal impression absent but oculo-cellar space shining; mandibles, palpi, a spot on chin near the base of mandibles (sometimes lacking), scape of antennae in front, greater part of front legs, mid and hind legs partly yellow). Length 6.7 - 7.8 mm — North Mongolia, the Ussuri region, Saghalien, Hokkaido, Honshu (Nikko and Nasu), Shikoku and the Loochoos (Yakushima Island)
- (*Crossocerus*) **emarginatus** (Kohl, 1915)
(= *pacificus* Gussakovskij, 1933)
- The 5th sternite of abdomen not or not campanulately deeply emarginated apically in the middle 29
- 29 Pronotum stoutly developed, with antero-lateral angles broadly produced (Fig. 21) (The 5th sternite of abdomen slightly triangularly emarginate at apex in the middle; mandibles, clypeus (sometimes not), a macula beneath chin near the base of mandibles yellow, scape of antennae usually black). Length 6.5 - 6.7 mm — Hokkaido (Sapporo, Jozankei and Hakodate)

and Shikoku

(Crossocerus) yasumatsui (Tsuneki, 1947)

- Pronotum not conspicuously developed, with antero-lateral angles nearly rounded (The 5th sternite of abdomen with apical margin nearly straight) 30

30 Terminal joint of antennae subtruncate at apex, end tergite of abdomen black, mesopleura distinctly and fairly closely, partly subrugosely punctured (Mandibles always black, scape in front yellow). (Length 3.0 - 4.7 mm — Hokkaido (Sapporo)

(Crossocerus) uchidai (Tsuneki, 1947)

- Terminal joint of antennae normal, end tergite of abdomen reddish brown at apex, mesopleura very finely, not closely punctured (Mandibles very frequently yellow). Length 5.0 - 5.3 mm — Europe, Saghalien, Honshu (Tokyo, Ikeda and Utsunomiya) and Kyushu

(Crossocerus) wesmaeli (Vander Linden, 1829)

1 Abdomen with yellow or whitish maculae 2

- Abdomen without maculae 7

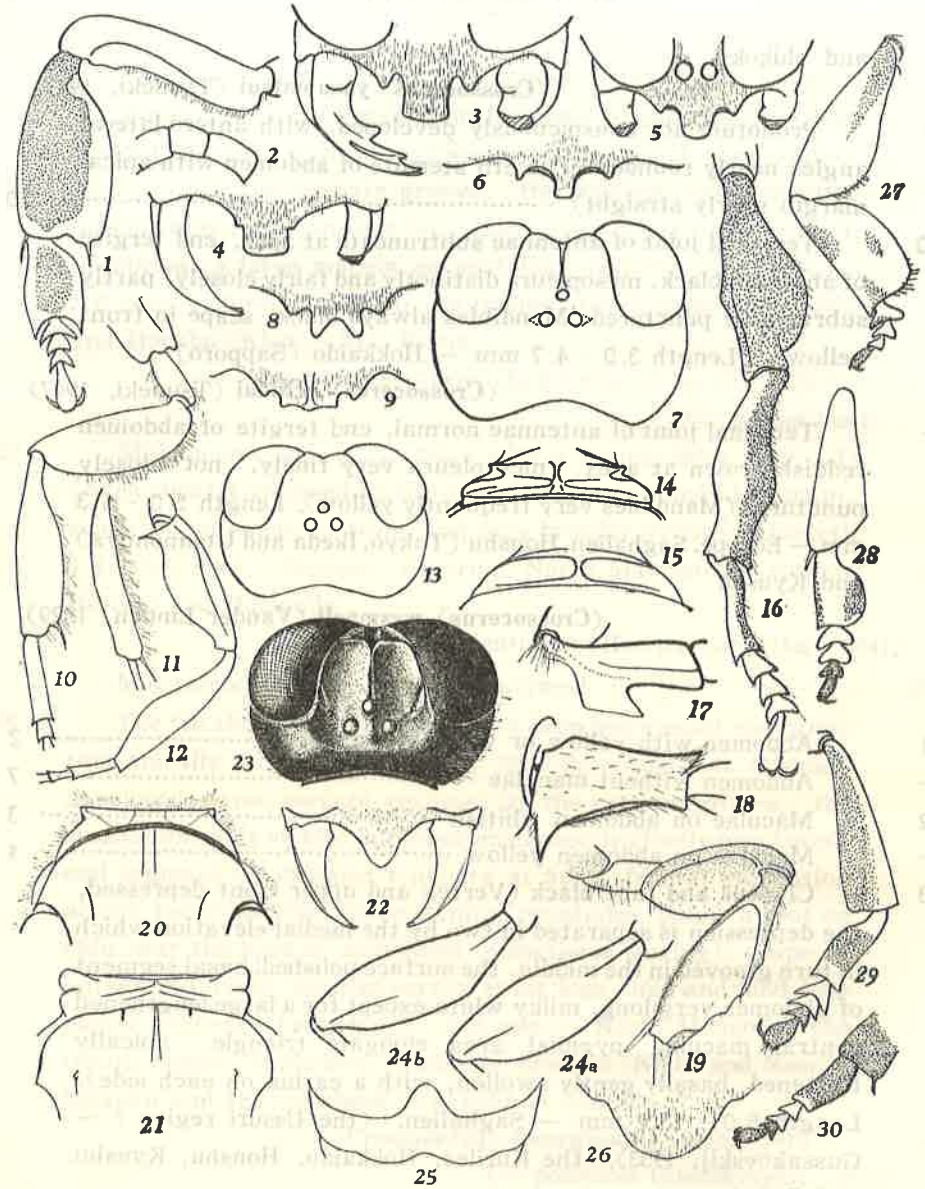
2 Maculae on abdomen whitish 3

- Maculae on abdomen yellow 4

3 Clypeus and face black (Vertex and upper front depressed, the depression is separated in two by the medial elevation which in turn grooved in the middle. the surface polished; basal segment of abdomen very long, milky white except for a large lengthened central macula, pygidial area elongate triangle, apically flattened, basally gently swollen, with a carina on each side). Length 8.0 - 13.2 mm — Saghalien. (the Ussuri region? — Gussakovskij, 1933), the Kuriles, Hokkaido, Honshu, Kyushu and Shikoku

(Blepharipus) monstrosus suzukii (Matsumura, 1912)⁹

- Clypeus yellow or yellowish white except the apical margin, face with yellowish streak along the inner margins of eyes (Head above not particularly depressed, the surface moderately punctured, basal segment of abdomen nearly as long as broad at apex, area pygidialis apically attenuate and gutterwise excavated). Length 6.7 - 8.5 mm — Europe, the Ussuri region,



Figs. 1-30 : 1, *Crossocerus cetratus* ♂, front leg. 2, Do., apical joint of antenna. 3, *Cinxius* ♀, clypeus and mandible. 4, Do., ♂. 5, *capitosus* ♂, clypeus. 6, Do., ♀. 7, Do., ♀, head seen from above. 8, *ambiguus hokkaidoensis* ♀, clypeus. 9, *amburensis* ♀, clypeus. 10, *barbipes* ♂, front leg. 11, Do., tibia in the lateral view. 12, *denticrus* ♂, mid leg. 13, *Cinxius* ♀, head seen from above. 14, *amburensis* ♀ ♂, pronotum. 15, *leucostomus* L. ♀ ♂, pronotum. 16, *yanoi* ♂, front leg. 17, Do., front trochanter. 18, Do., hind coxa. 19, Do., mid leg. 20, *yasumatsui* ♀, pro and mesonotum. 21, Do., ♂. 22, *flavitarisus*, clypeus (♀ ♂) and mandible (♂). 23, *yanoi* ♀, head seen from above. 24a, *vagabundus yamatonicus* ♂, front femur. 24b, Do., slightly angulated beneath before middle. 25, *emarginatus* ♂, 5th and 6th ventral plates of abdomen. 26, *leucostomus* L. ♀, clypeus. 27, *ambiguus* ♂, front leg. 28, *tarsatus* ♂, front leg. 29, *varus* ♂, front leg. 30, *leucostomus* L. ♂, front leg.

Hokkaido and Honshu (Nikko)
 (*Coelocrabro*) *walkeri* (Shuckard, 1837)

- 4 The 1st abdominal tergite nearly as long as broad at apex, vertex anteriorly not depressed, pygidial area apically narrowed and grooved, basally roundly elevated and provided with the median keel (Mesopleural tooth present; scape of antennae, two maculae on the 2nd and 3rd tergites, a band or two spots on the 5th tergite and legs in part yellow). Length 7.2 - 11.5 mm — Saghalien, the Kuriles, Hokkaido, Honshu, Shikoku and Korea
 (*Acanthocrabro*) *vagabundus yamatonicus* (Tsuneki, 1947)²⁾
- 5 The 1st abdominal tergite longer than broad, vertex anteriorly depressed, pygidial area triangular, basally slightly elevated, without medial keel 5
- 5 Pronotum rectangular, with antero-lateral angles rather obtusely pointed, mid femora beneath seen from behind abruptly narrowed beyond the middle, vertex fairly closely and distinctly punctate, not polished (Mandibles in part, antennal scapes, (sometimes two maculae on clypeus, rarely two spots on pronotum) two large maculae on the 3rd tergite and front and mid legs partly yellow). Length 10.3 - 13.0 mm — Hokkaido (Jozankei and Sounkyo), Honshu (Nikko, Kamikochi and Sasayama), Shikoku and Korea
 (*Ainocrabro*) *aino* (Tsuneki, 1947)
- 6 Pronotum subtrapezoidal, with antero-lateral angles rounded, anteriorly gently, more or less roundly inclined, mid femora beneath gently rounded, only slightly narrowed beyond the middle, vertex polished 6
- 6 Mesopleural tooth distinct, posterior aspect of propodeum with lateral carinae distinct throughout the area, upper frons sharply bordered in front and acutely excavated in the middle by the median furrow (Fig. 23), as a rule the 1st abdominal segment without maculae. Length 10.3 - 12.0 mm — Hokkaido (Sapporo, and Sounkyo), Shikoku and Korea (Keijo and Kodaisan)
 (*Blepharipus*) *yanoi* (Tsuneki, 1947)
- 7 Mesopleural tooth absent, posterior aspect of propodeum with lateral carinae definable only on the posterior portion, upper frons not so sharply bordered in front and not so acutely excavated in the middle by the frontal furrow, as a rule the

3,
7,
♀,
♂,
5,
8,
m
ed
6,
9,

- 1st tergite with U-shaped marking on the margin. Length 7.3 - 11.0 mm — Saghalien, the Kuriles, Hokkaido, Honshu (northern region or high altitude) and Korea
- (*Blepharipus dimidiatus sapporoensis* (Kohl, 1915)⁸⁾
- 7 Pygidial area gutterwise excavated at least on the apical portion 8
- Pygidial area triangular, the surface flattened — (subgenus *Crossocerus*) 24
- 8 Mandibles with a small tooth on the inner margin toward the middle, the excavation on pygidial area Y-shaped, rather trilobate, mesopleuron with a distinct tooth in front of mid coxae. — (subgenus *Ablepharipus*) 9
- Mandibles without a small tooth on the inner margin, the excavation on pygidial area simple, thorax with or without mesopleural tooth — (subgenus *Coelocrabro*) 12
- 9 Length 3.5 - 5.2 mm. Head from above nearly square, scuto-scutellar furrow not crenate, upper portion of propodeum seen from above subtriangular, with lateral borders edged, sides of the segment deeply excavated, metapleuro-propodeal suture not grooved. (Area cordata polished; without median groove and enclosing furrow). — Saghalien, Hokkaido, the Kuriles and Honshu
- (*Ablepharipus shibuyai* (Iwata, 1934)
- Length 5.5 - 9 mm. Head from above wider than long (ratio approximately 8 : 5), scuto-scutellar furrow crenate, upper portion of propodeum seen from above rounded, lateral border not edged, the sides of the segment not excavated, metapleuro-propodeal suture on its upper one-third deeply excavated (Area cordata with or without the median groove and enclosing furrows) 10
- 10 Length 6 - 9 mm, humeral angles and mid tibiae except the basal ring black (Area cordata feebly enclosed by the groove, as a rule pronotum and scutellum without maculae). — Europe, Hokkaido, the Kuriles and Honshu (Nikko)
- (*Ablepharipus assimilis* (Smith, 1856)
- (= *tirolensis* Kohl, 1877)
- Length 5.5 - 7.5 mm. Humeral angles and mid tibiae on its outer surface yellow 11
- 11 End of occipital carina produced into an acute point, area

cordata on propodeum encircled by the well-defined furrow (The impression on pygidial area approximately straight on its upper border, head and mesonotum finely coriaceous and sparsely punctured, sides of propodeum finely closely striate). Length 6.0 - 6.4 mm — Europe, Algeria, Korea and Saghalien

(*Ablepharipus*) *podagricus* (Vander Linden, 1829)⁴⁾

End of occipital carina gradually terminate, area cordata either encircled by a feeble groove or not encircled, (The impression on area pygidialis distinctly Y-shaped, head and mesonotum more finely and densely coriaceous and vertex impunctate, sides of propodeum without striation in the central portion). Length 5.5 - 7.5 mm — Europe, Hokkaido and Honshu

(*Ablepharipus*) *congener* (Dahlbom, 1845)⁵⁾

12 Hind tibiae not spinose on the outer surface (Hind tibiae strongly clavate and the following metatarsi incrassate) 13

Hind tibiae spinose on the outer margin (Hind tibiae either strongly or moderately clavate, the following metatarsi sometimes incrassate sometime not) 14

13 Clypeus : Fig. 3, head : Fig 13, hind trochanters black, head slightly wider than long, with the surface half-mat. Length 6.5 - 7.8 mm — Europe, Kokkaido and Honshu (Kurobe valley)
(*Coelocrabro*) *cinxius* (Dahlbom, 1838)

Clypeus : Fig. 6, head : Fig 7, hind trochanters in most specimens white, head very thick, nearly square from above, with the surface polished. Length 5.2 - 8.5 mm — Europe, Hokkaido, Honshu, shikoku and kyushu

(*Coelocrabro*) *capitosus* (Shuckard, 1837)

14 Face along the inner margins of eyes yellow (Clypeus yellow, sides of pygidial area provided with somewhat stiff long hairs, mesopleural tooth absent; area cordata incompletely encircled by the groove or not enclosed, the surface polished). Length 6.7 - 8.5 mm — Europe, Hokkaido and Honshu (Nikko)

(*Coelocrabro*) *walkeri* (Shuckard, 1837)

Face entirely black 15

15 Area cordata distinctly and completely enclosed by the crenate groove 16

Area cordata not or not completely enclosed by the crenate groove 19

- 16 Clypeus short, on the apical border armed with two short teeth produced in parallel, (Fig. 8) all the legs adorned broadly with bright yellow maculae (Occipital carina gradually terminated at the ends, not produced into a tooth as in the typical race). Length 5.7 - 7.3 mm — Hokkaido and Saghalien
(*Coelocrabro*) *ambiguus hokkaidoensis* Tsuneki, 1954⁵⁾
- Clypeus not armed with two short teeth on the anterior margin 17
- 17 Legs broadly yellowish white or testaceous, mesonotum polished, anteriorly with sparse fine punctures, mesopleural tooth absent, 1st abdominal segment distinctly longer than wide at apex, pygidial area apically comparatively broad, not gutterwise excavated, basally without elevation (Head smooth and polished, scape in front whitish, humeral angles testaceous, wings slightly yellowish, clypeus tridentate at apex in middle, hind tibiae strongly clavate and sparsely spinose). Length 6.0 mm (Figs. 35 - 43). — Japan (Nikko)
(*Coelocrabro*) *tanakai* Tsuneki, 1954
- Legs nearly entirely black or blackish, mesonotum finely, fairly closely punctured, mesopleural tooth present, 1st abdominal segment approximately as long as wide at apex (or only slightly longer than wide), pygidial area apically distinctly narrowed and gutterwise excavated, basally remarkably swollen ... 18
- 18 Pronotum from above : Fig. 15, clypeus : Fig. 26 ; body entirely black except hind tibial spurs which are white, area cordata not polished, mesopleural tooth short (Hind tibiae strongly clavate and the following metatarsi remarkably incrassate). Length 6.8 - 7.3 mm — Europe, the Ussuri region, Saghalien and Hokkaido. (Sounkyo)
(*Coelocrabro*) *leucostomus* (Linne, 1758)
(= *carbonarius* Dahlbom, 1838)
- Pronotum : Fig. 14, clypeus : Fig. 9 ; scape of antennae in front and base of hind tibiae dirty yellow, tibial spurs of hind legs dark brown, area cordata polished, mesopleural tooth very distinct (Hind tibiae somewhat clavate and the following metatarsi slightly incrassate, both not so conspicuous as in the preceding species). Length 7.5 - 9.5 mm — The Amur and the Ussuri regions, Hokkaido (Jozankei and Hakodate), the Kurile

- Islands and Honshu (Nikko and Hakusan) (Coelocrabro) *amurensis* (Kohl, 1915)
- 19 Area cordata partly enclosed by the crenate groove (The groove posteriorly distinct and anteriorly indistinct or very faint) ... 20
- Area cordata not enclosed by the furrow 21
- 20 Entirely black, mesopleural tooth absent, vertex distinctly punctured, upper front finely granulate, mat, area cordata except the medial furrow microscopically sculptured, half-opaque. Length 7.2 - 9.8 mm — Europe, Saghalien, the Kuriles, Hokkaido, Honshu (Nikko, Nasu, Chichibu and Kamikochi) and the Loochoos (Yakushima Island) (Coelocrabro) *barbipes* (Dahlbom, 1845)
- Mandibles and legs partly brown, hind tibiae with yellowish basal ring, mesopleural tooth present, vertex practically impunctate, highly polished, upper front moderately punctured but not mat, area cordata except the medial furrow smooth and shining. Length 5.3 - 6.7 mm — Europe, Saghalien and Honshu (Nikko and Hakusan) (Coelocrabro) *hydenii* (Kohl 1880)
- 21 Clypeus apically in the middle truncate (Entirely black, with the exception of brownish tibial spurs, mesopleural tooth absent). Length 6.8 - 9.5 mm — Europe, the Ussuri region, Saghalien, the Kuriles, Hokkaido and Honshu (Nikko, Nasu, Hakusan and Kamikochi) (Coelocrabro) *cetratus* (Shuckard, 1873)
- Clypeus apically in the middle not truncate 22
- 22 Clypeus apically in the middle triangularly produced (Fig. 22). (Smooth and shining; scape in front, pronotum, humeral angles, two small spots on scutellum, front and mid legs except basal half of femora, tarsi and basal half of tibiae of hind legs yellow; mesopleural tooth indistinct, pygidial area nearly equilateral triangle in form, roundly elevated, apically abruptly narrowed and very slightly excavated at apex. Length 4.7 - 5.3 mm — Hokkaido) (Coelocrabro) *flavitarsus* (Tsuneki, 1947)
- Clypeus apically in the middle bluntly tridentate (Legs more or less with yellow maculae 23
- 23 Hind tibiae strongly clavate, the 1st abdominal tergite ap-

proximately 1.5 times as long as broad at apex, pubescence on head and thorax not long. Length 6.5 mm — The Ussuri region and the Kurile Islands

(*Coelocrabro*) *pauillus* (Gussakovskij, 1933)

(= *sugiharai* (Iwata, 1938))

Hind tibiae not so conspicuously clavate, the 1st abdominal tergite as long as broad at apex, pubescence on head and thorax fairly long and dense. Length 6.2 - 8.3 mm — Europe, Hokkaido, the Kuriles and Honshu (norther region and high altitude)

(*Coelocrabro*) *pubescens* (Shuckard, 1837)

24 Mesopleural tooth distinct, the groove enclosing area cordata tends to become obsolete anteriorly 25

Mesopleural tooth not definable, the groove enclosing area cordata complete and distinct 26

25 The 1st tergite of abdomen as long as broad at apex, front tibial spurs yellow (Pronotum with anterior margin slightly reflected at the sides, area cordata finely striate, mandibles black, apically brownish, scape of antennae in front, two spots on pronotum, very frequently a macula on scutellum yellow). Length 7.0 - 8.0 mm — Europe, Algeria, Saghalien, the kuriles, Hokkaido and Honshu (Kiso, Mt. Koma)

(*Crossocerus*) *varus* (Lepelletier et Brullé, 1834)

(= *varius* auctt.)

The 1st tergite of abdomen longer than broad, body generally slenderer than in the preceding species, usually front tibial spurs dark brown (More deeply black than the preceding species, without bronzy reflection on all parts of the body; other characters in both structure and maculation are similar to those of the preceding species). Length 5.0 - 7.0 mm — Europe, Korea and Honshu (Kamikochi)

(*Crossocerus*) *tarsatus* (Shuckard, 1837)

(= *palmipes* auctt., nec Linné, 1767)

26 Pronotum flattened above, with antero-lateral angles pointed (Fig. 20) (Mandibles brown, scape of antennae brownish black, two spots on pronotum, apex of front and mid tibiae, basal ring of hind tibiae yellow). Length 7.0 - 7.3 mm — Hokkaido (Sapporo, Jozankei and Hakodate) and Shikoku

(*Crossocerus*) *yasumatsui* (Tsuneki, 1947)

- Pronotum not flattened above, antero-lateral angles not pointed 27

27 Frontal median groove in front of anterior ocellus indistinct, definable only as a feeble line in certain light, mesonotum on the posterior margin just in front of scutellum not costately striate (Mandibles and scape of antennae in front yellow, thorax, humeral angles and wing-tegulae dark brown, pygidial area black, legs broadly yellow) Length 5.5 - 5.7 mm. — Europe, Algeria, North Manchuria, Korea, Hokkaido and Honshu (as described by *Crossocerus*) *denticrus* (Herrich-Schaeffer, 1841)

- Frontal median furrow well-defined, mesonotum on the posterior margin crenulate 28

28 Body entirely black, antennal scape in front a streak on front legs, a spot at base of mid and hind tibiae yellow, comparatively large species (7.2 - 8.5 mm) (The 1st segment of abdomen slightly longer than broad at apex) pronotum with anterior margin gently rounded and not edged, having a transverse furrow across the middle, antero-lateral angles rounded or minutely angulated, area cordata finely striate but shining).

— North Mongolia, the Ussuri region, Saghalien, Hokkaido, Honshu (Nikko and Nasu), Shikoku and the Loochoos (Yakushima Island)

(*Crossocerus*) *emarginatus* (Kohl, 1915)

(= *pacificus* Gussakovskij, 1933)

Body more or less with yellow maculae, legs more broadly maculated 29

29 Mesopleura distinctly, fairly closely, partly subrugosely punctured (The 1st tergite of abdomen as long as broad at apex, area cordata smooth and polished, mandibles and clypeus black, usually carrying two yellow spots on pronotum, end segment of abdomen wholly black). Length 4.5 - 5.2 mm. — Hokkaido (Sapporo)

(*Crossocerus*) *uchidai* (Tsuneki, 1947)

Mesopleura practically impunctate 30

30 Head above in front of anterior ocellus very finely granulate, mat, posteriorly practically impunctate and shining, the contrast is especially striking, pronotum with anterior margin edged, pygidial area wholly black (Mandibles, two large maculae on

clypeus, scape of antennae in front, a line on pronotum, humeral angles, usually a macula on scutellum, all tarsi (apically brownish), outer face of all tibiae yellow). Length 5.2 - 5.7 mm — Hokkaido (Jozankei) and Honshu (Ohtawara — Tochigi Pref.)

(*Crossocerus*) *opacifrons* (Tsuneki, 1947)

— Head above in front of anterior ocellus not granulate punctured, more or less shining, pronotum with anterior margin not edged, pygidial area with apical half reddish brown (Mandibles) at least in part, yellow; sometimes the following portions are also yellow: two large maculae on clypeus, scape of antennae in front, a band on pronotum, humeral angles and the large part of legs). Length 5.2 - 5.8 mm — Europe, Saghalien, Honshu (Tokyo and Osaka) and Kyushu

(*Crossocerus*) *wesmaeli* (Vander Linden, 1829)

II. DESCRIPTIONS OF NEW SUBGENUS, NEW SPECIES

AND NEW SUBSPECIES

1. *Ainocrabro* subgen. nov.

The 1st segment of abdomen longer than wide at apex, occipital carina not produced into a tooth at its ends, vertex and upper front distinctly depressed but not divided into two areas by the medial carina or elevation, fairly closely punctured; mandibles bifid at apex not only in the male but also in the female, without tooth on the inner margin near the middle; basal lamella of hind wings shorter than submedial cell. In the male, antennal flagella beneath with erect hairs, in form normal with distal joint somewhat spatulate; the 7th sternite of abdomen without hooks and medial tubercle, legs all normal, not modified nor toothed. In the female pygidial area elongate triangle in shape, apically feebly grooved, basally gently roundly swollen, not carinated in the middle.

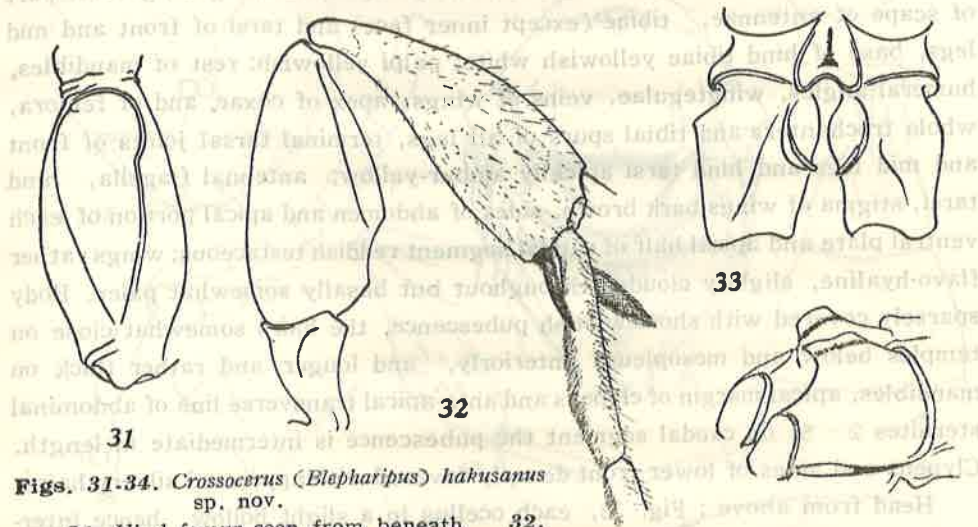
Type: *Crossocerus aino* (Tsuneki, 1947)

2. *Crossocerus* (*Blepharipus*) *hakusanus* sp. nov.

♂. Very closey resembles the male of *Cr.* (*Bleph.*) *monstruosus suzukii* Mats. in maculation, but in structure this is rather very similar to the male of *Cr.* (*Bleph.*) *dimidiatus sapporoensis* (Kohl, 1915), differing from the latter species only in the following points:

1. Maculation white in colour which is as follows: Scape of antennae

except dorso-apical portion, palpi, two faint spots on pronotum, humeral angles, a pair of L-shaped maculae on the tergite and a broad band on the sternite of the 1st abdominal segment, a spot on each side of the 3rd tergite, two very minute faint spots on the 6th tergite, apex of coxae, trochanters wholly and metatarsi of all legs, basal half of femur, outer face of tibia and tarsal joints 2 and 3 of front legs, outer face of mid tibiae irregularly, and base and a spot on apical portion of outer face of hind tibiae. Mandibles yellowish white with apex brownish. Rest of tarsi light brown.



Figs. 31-34. *Crossocerus (Blapharipus) hakusanus* sp. nov.

31, Hind femur seen from beneath. 32, Hind leg. 33, Hind coxae seen from beneath showing ()-shaped coxal processes. 34, Do. in the lateral view.

2. Clypeus similar in form to that of *dimidiatus*, but the apical margin comparatively broader and more gently emarginate in the middle, with lateral angles rounded.
3. Upper front more convex and less depressed laterally, with frontal medial furrow more shallowly excavated and not reaching anterior ocellus.
4. Pronotum with medio-anterior depression somewhat deeper.
5. Front trochanter without any sort of lamellate appendage.
6. Coxal process of hind leg (Figs. 33, 34), subtrapeziform in the lateral view, with postero-apical angle pointed.
7. Hind femur (Figs. 31, 32) thicker and more robust, with inner surface more strongly (obliquely) excavated and with carinate edge on the under side.
8. Hind tibia also comparatively broader, with outer surface more sparsely and less strongly spinose (Fig. 32).
9. Mid and hind tarsal joints seem to be much thicker than in the com-

pared species.

Length 9.2 mm. ♀ unknown.

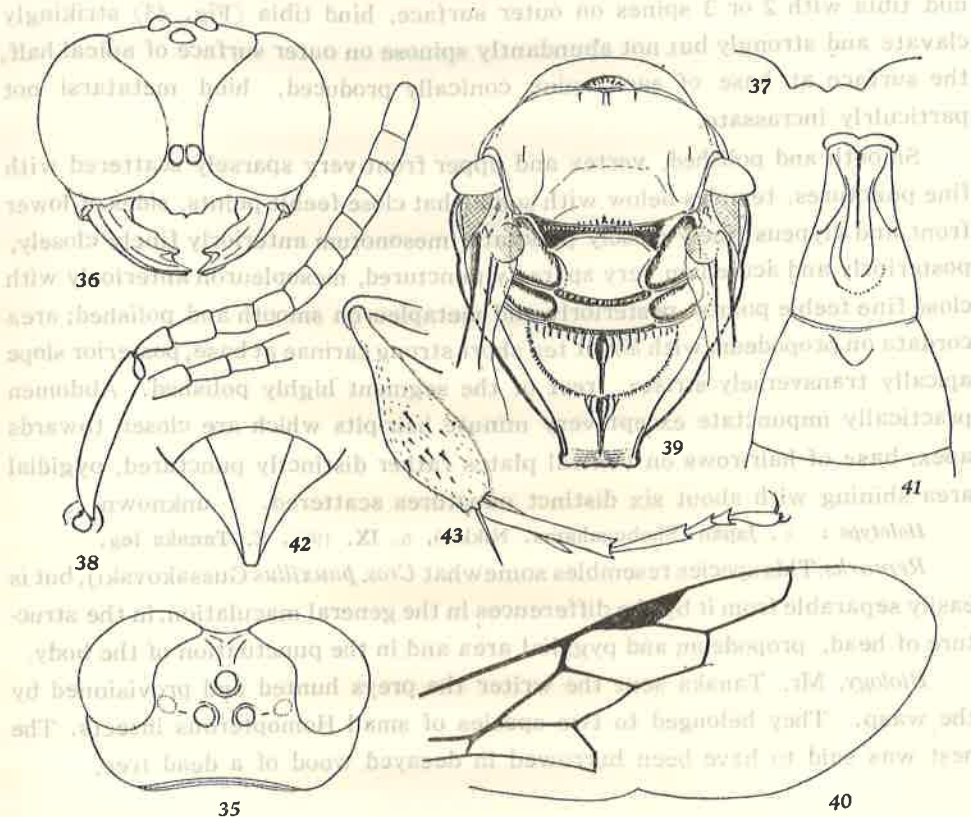
Holotype: ♂, Japan (Shiramine-mura, Ishikawa Pref., at the foot of Mt. Haku), 15. VI. 1949, I. Togashi leg.

3. *Crossocerus* (*Coelocrabro*) *tanakai* sp. nov.

♀. Length 6.0 mm. Black and shining, with a faint bronzy shimmer in certain light on mesonotum. Mandibles except apex and margins, greater part of scape of antennae, tibiae (except inner face) and tarsi of front and mid legs, base of hind tibiae yellowish white; palpi yellowish; rest of mandibles, humeral angles, wingtegulae, veins of wings, apex of coxae, and of femora, whole trochanters and tibial spurs of all legs, terminal tarsal joints of front and mid legs and hind tarsi apically ambur-yellow; antennal flagella, hind tarsi, stigma of wings bark brown, sides of abdomen and apical portion of each ventral plate and apical half of caudal segment reddish testaceous; wings rather flavo-hyaline, slightly clouded throughout but basally somewhat paler. Body sparsely covered with short whitish pubescence, the hairs somewhat close on temples below and mesopleura anteriorly, and longer and rather thick on mandibles, apical margin of clypeus and ante-apical transverse line of abdominal sternites 2 - 5, on caudal segment the pubescence is intermediate in length. Clypeus and sides of lower front densely covered with appressed silvery hairs.

Head from above: Fig. 35, each ocellus in a slight hollow, hence intervals elevated, a fine short groove on oculocellar line, at its end, close to eye located frontal impression, not particularly impressed and definable only by the opaque surface, in size less than as large as ocellus and in form oval; OOD : PÖD approximately 2 : 1, frontal medial furrow in front of anterior ocellus distinct, the sides gently roundly inclined towards the furrow. Head seen in front (Fig. 36) with inner margins of eyes remarkably narrowed below, no space between antennal sockets and between one of them and eye, clypeus: Fig. 37, medianly gently convex, mandibles tridentate at apex, slightly produced on inner margin near middle (Fig. 36). Eyes with ommatidia anteriorly very large and posteriorly very small, the contrast being extraordinary (ratio in length 3 : 1); antennae (Fig. 38) short, robust, joint 1 (except basal tubercle) approximately as long as 4 subsequent joints combined, joint 3 twice (in the narrowest view) or one and a half times (in the broadest view) as long as broad at apex, rest of joints gradually thicker and shorter towards apex, apical joint long, slightly less than as long as 2 preceding joints united and somewhat spatulate apically. Head in profile with eye wider than temple (ratio

16:10), occipital carina distinct, gradually terminate at ends. Pronotum not well developed, depressed much below the level of mesonotum, anteriorly roundly inclined, without antero-lateral angles, medio-posteriorly with a lunate impression which is feebly icrenated (Fig. 39), prosternal tubercles, conical, not pointed at apex, mesonotum remarkably convex, medio-anteriorly broadly and distinctly impressed, on each side of the impression and slightly apart



Figs. 35 - 43. *Crossocerus* (*Coelocrabro*) *tanakai* sp. nov.

35, Head seen from above. 36, Do., seen in front. 37, Clypeus. 38, Antenna. 39, Thorax. 40, Fore wing. 41, The 1st and 2nd abdominal tergites. 42, Pygidial area. 43, Hind leg.

from it provided with a short well-defined carina, disc flatly inclined sidwards on the lateral portions and backwards on the posterior portion, posterior margin transversely feebly furrowed and crenate, scutellum characteristic in form (Fig. 39) and very convex, mesopleuron with epicnemial carina and epicnemial crenate furrow distinct, mesopleural tooth absent, propodeum with area cordata convex, distinctly encircled by crenate groove and medially longitudinally

furrowed, the furrow extends to the posterior slope, broadened at base, sides of the segment anteriorly obliquely excavated, separated from posterior slope only on apical portion by the carina. The 1st segment of abdomen (Fig. 41) longer than wide at apex (ratio 24 : 16), pygidial area (Fig. 42) rather similar to that in subgen. *Blepharipus*. Venation of wing : Fig. 40, front coxa beneath margined by carina and sharply pointed at latero-anterior corner, front and mid tibia with 2 or 3 spines on outer surface, hind tibia (Fig. 43) strikingly clavate and strongly but not abundantly spinose on outer surface of apical half, the surface at base of each spine conically produced, hind metatarsi not particularly incrassate.

Smooth and polished, vertex and upper front very sparsely scattered with fine punctures, temples below with somewhat close feeble points, sides of lower front and clypeus finely closely punctate; mesonotum anteriorly finely closely, posteriorly and acutellum very sparsely punctured, mesopleuron anteriorly with close fine feeble points. posteriorly and metapleuron smooth and polished; area cordata on propodeum with about ten short strong carinae at base, posterior slope apically transversely striate, rest of the segment highly polished. Abdomen practically impunctate except very minute hair-pits which are closer towards apex, base of hair-rows on ventral plates rather distinctly punctured, pygidial area shining with about six distinct punctures scattered. ♂ unknown.

Holotype : ♀. Japan (Shobugahama, Nikko), 6. IX. 1953, E. Tanaka leg.

Remarks. This species resembles somewhat *Cros. pauxillus* Gussakovskij, but is easily separable from it by the differences in the general maculation, in the structure of head, propodeum and pygidial area and in the punctuation of the body.

Biology. Mr. Tanaka sent the writer the preys hunted and provisioned by the wasp. They belonged to two species of small Homopterous insects. The nest was said to have been burrowed in decayed wood of a dead tree.

4. *Crossocerus* (*Coelocrabro*) *ambiguus hokkaidoensis* subsp. nov.

This subspecies differs from the nominate race in having the occipital carina not produced into a tooth but terminated gradually at its end. Moreover, the teeth produced on the anterior margin of the clypeus in the female are somewhat shorter and narrower than in the typical form.

Holotype : ♀, Japan (Hokkaido), 6. VI. 1944, K. Tsuneki leg.

Paratypes : 18 ♀♀, Japan (Hokkaido).