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FURTHER NOTES AND DESCRIPTIONS ON SOME FORMOSAN
SPHECIDAE (HYMENOPTERA)

By K. Tsuneki

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FURTHER NOTES AND DESCRIPTIONS ON SOME FORMOSAN
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Abstract. New taxa dealt with in the present paper:

New species: Dolichurus apiciornatus, Trypoxylon venustum, T. planifrons, Stigmus murotai, Ectemnius (Cameronitus) laevidorsis Crossocerus (Alicrabro) breviclypeatus. New subspecies: Bembecinus quadratus lanhsuanus, Cerceris umbinifera kentinensis, Tachysphex nigricolor lanhsuensis, Lestica (Solenius) collaris maculata. The species to which the male is for the first time described: Trypoxylon melanocorne Strand, T. takasago Tsuneki, Polemistus formosanus (Tsuneki), Carinostigmus saigusai (Tsuneki) and Rhopalum mushaense Tsuneki. Alysson formosanus Tsuneki is sunk to a subspecies of A. pertheesi Gorski, Oxybelus agilis Smith is confirmed to occur in Formosa and notes on some rare or variable species are given.

The specimens used in the present paper are mainly those collected by Mr. T. Murota and partly those collected by a party of the Japanese entomologists led by Mr. T. Tano and sent to me for identification.

Dolichurus apiciornatus sp. nov.

Characteristic in the transverse supraantennal platform, white marking on its apex and on the clypeus, weak sculpture on the frons, medianly roundly produced and apically incrassate clypeus and rugoso-subreticulate dorsal aspect of propodeum.

♀. Length 7.0 mm. Black and shining; marginal area of supraantennal lamina, a small mark on anterior part of clypeus and anterior half of wing tegula ivory white, always with transparent outer margin; mandible, palpi, articulations of legs, fore tibia in front, tibial spurs and fore tarsus beneath ferruginous; tibiae and tarsi more or less brownish. Body covered with silky white pubescence, pubescence on clypeus and dorsal side of thorax-complex short, not dense, mixing less numerous longer somewhat stiff hairs, on sides longer, vertex and dorsal side of gaster almost glabrous, on the rest of gaster very short.

Head from above ocell in an equilateral triangle, OOD : POD : OCD = 7 : 6 : 20, postocellar width relatively 4, seen in front: Fig. 1, minimum IOD above and below and maximum IOD in middle of face relatively 15 : 20 : 22, lamina in vertical view: Fig. 2, slightly impressed latero-basally and medio-anteriorly, lateral margins attach to the dorsal parts of socket rings of the antennae and anteriormost area curves downwards and then folded inwards as a triangular interantennal area. Clypeus medianly roundly elevated and anterior roundly produced part slightly incrassate and reflected. Head seen in profile: Fig. 3. Antenna filiform, long, joint 1 unicarinate (in Fig. 1), joint 3 appr. 6 times as long as broad at apex, subsequent joints gradually slightly reducing in both length and width towards apex, penultimate joint appr. half the length of joint 3. Pronotum in dorsal view: Fig. 4, collar edged on lateral margin in middle, with disc broadly bituberculate, seen from obliquely from side and above: Fig. 5. On mesopleuron hypopleural area roundly and highly raised, higher than in D. formosanus; metasternum: Fig. 6. Propodeum: Fig. 7, in lateral view: Fig. 8, posterior aspect flattened and characteristically margined with carinae: Fig. 9. Gasteral segments 1, 2, 3 constricted, sternite 2 with anterior carina above the basal fossa markedly incrassate.

Legs as in formosanus; tarsal claw: Fig. 10. Cubital cells 2 and 3 of fore wing: Fig. 11, the 3rd cell much less narrowed than in formosanus, with outer vein less strongly sinuate.

General sculpture on frons as in Fig. 2, medial carina, lateral rugae and punctures very weak and the surface fairly well shining; punctures laterally and upwards finer, sparser and weaker; lamina finely, moderately closely and very shallowly punctulate. Clypeus smooth and polished. Collar of pronotum on anterior inclination transversely finely closely rugoso-striate; haired areas pro- and mesonotum with sparse fine hair points, mesopleuron smooth and shining, with a few comparatively large shallow, not well outlined punctures on postero-ventral portion. Sculpture pattern of propodeum: Fig. 7, rugae not strong, with interspaces minutely uneven.

♂, unknown.

Holotype: ♀, Pempuchi, Nantou Pref., 19.VIII. 1976, T. Murota leg. (Coll. Tsuneki).

Paratype: 1 ♀, Ditto. (Coll. Murota).

Remarks. Recently Nagy (Boll. Soc. Ent. Ital., 103: 106, 1971) described three species of Dolichurus from Formosa. He is, however, so bold that he described them without knowledge on the species hitherto known from Formosa, because in his list of references Strand's, Yasumatsu's and my papers are not given. Moreover, his descriptions are surprisingly simple and superficial, of course without figure, like those of the early authors and the true feature of the species can not be grasped. Such descriptions as this can not contribute to complete our knowledge, but only bring in confusion and problem to future. Of the species described by him D. ombrodes seems somewhat resembling the present species, but even as far as given several differences are observed and I can not identify the present species with it.

Dorichurus formosanus Tsuneki, 1967

Dorichurus formosanus Tsuneki, Etizenia, 21: 6, 1967 (Mt. Ali).

Specimen examined: 1♀, Pempuchi, Nantou Pref., 30. VII., Chizuko Nozaka leg.

Sphex madasummae Van der Vecht, 1973

Sphex madasummae Van der Vecht, Proc. Kon. Nederl. Akad. Wetenschap. C, 76: 345, 1973.

Sphex (Sphex) sulciscutus: Yasumatsu, Tenthredo, 2: 75, 1938 (Botel Tobago).

Sphex (Sphex) maurus: Tsuneki, Etizenia, 26: 3, 1967 (ditto).

Specimens examined: Numerous ♀ ♂, Tungching, Lan-hsu (Botel Tobago), 8.VIII. T. Murota and T. Tano leg.

Sphex praedator luteipennis Mocsary, 1883

Sphex praedator luteipennis: Van der Vecht, Proc. Kon. Nederl. Akad. Wetensch. C, 76: 348, 1973.

Sphex (Sphex) luteipennis: Tsuneki, Life Study, 17 (3-4): 39, 1973. (Kentin Park).

Specimen examined: 1♀, Pingtung Pref. (Kentin Park), 3. VIII., T. Murota leg.

Isodontia auripygatus Strand, 1913

Sphex (Isodontia) auripygatus Strand, Arch. Naturg., 1913, A, (3): 80, 1913.

Sphex (Isodontia) auripygatus: Yasumatsu, Tenthredo, 2 (1): 123, 1938.

Specimens examined: 2 ♀ 1 ♂, Pingtung Pref. (Kentin Park), 3. VIII., T. Murota leg.

Cerceris umbinifera kentinensis ssp. nov.

Cerceris umbinifera: Tsuneki, Etizenia, 60: 4, 1971.

Differences in colouration (maculae much better developed) of the Formosan specimens from the typical race were already given in detail in the paper above listed. Furthermore, in the specimens of Formosa the first segment of abdomen is slightly longer than wide.

♀, unknown.

Holotype: ♂, Kentin Park, Pingtung Pref., 30. VII. 1970, Y. Haneda leg. (Coll. Tsuneki).

Argogorytes fuliginosus Tsuneki, 1968

Argogorytes fuliginosus Tsuneki, Etizenia, 31: 2, 1968 (♀ ♂, Pempuchi); *ibid.*, 56: 1, 1971 (♀, Pempuchi).

Specimen examined: 1 ♂, Chuchi, Chiai Pref., 29-30. VII., T. Murota leg.

Some supplementary description on the male. The present species is characteristic in the very coarse striation on the mesopleuron and the side of the propodeum (Fig. 16) and, strange enough, the visible gastral segments are usually 6 in number, owing to the retraction of the 7th segment into the 6th. Moreover, the 6th segment is apically narrowed as if to be the caudal segment and the specimen is likely to be mistaken as a female. The jugal lobe of the hind wing of this species is longer than half the anal area. Head: Figs. 12, 13 and 14. Clypeus and mandible seen somewhat from beneath: Fig. 15. Mesosternal median carina strong and distinct (Fig. 17, MC mosocoxa), basal gastral segments: Figs. 18 and 19; 8th sternite: Fig. 21, right half of genitalia seen from inside: Fig. 22 (P penis valve, V volsella), paramere seen from outside: Fig. 23, penis valve from outer side: Fig. 24, from ventral side: Fig. 25, volsella: Fig. 26.

Bembecinus hungaricus formosanus (Sonan, 1928)
in the Lan-hsu or Botel Tobago Is.

Bembecinus hungaricus formosanus: Tsuneki, Etizenia, 31: 6-12, 1968 (with ref.)

Specimens examined: 135 ♀ 15 ♂, Lan-hsu (Hungtou and Tungching), 6-9. VIII. T. Tano and T. Murota leg.

Mandibles and fore tarsal combs markedly shortened.

It is very remarkable that in the greater part of the specimens the organs mentioned are strikingly abbreviated, the abbreviation far surpassing the ordinary abrasion observed in the non-fresh specimens. The mandible loses one third, half or more of its original length and becomes like a wooden pestle and the comb bristles of the fore metatarsus are also markedly shortened and some of them are dropped off. The fact indicates that the habitat of the specimens is not the sandy area as usually observed in this genus, but the area of hard texture of soil or sand stone and to dig the burrow into the place is a very consuming work. In the sandy ground the abrasion of the mandibles of the wasps living there is only a little, at most losing the dentate structure of the apical part. As against the striking abrasion of the metatarsal bristles it is a marked contrast that comb spines of the following joints are almost normal. But it is explained by their habits that while they use the fore legs in digging the burrow the tarsi are curled up inwards and metatarsi alone scrape the ground. At any rate, the wasps of this species of the Botel Tobago may have changed their habits, or they are compelled to live in such a habitat

by the environmental pressure.

Variation in maculation (cf. Tsuneki, 1971, Tables 1 and 2).

(A) Black mark on clypeus (in the specimens of the main island of Formosa clypeus always wholly yellow). A mark is observed in 3♀0♂, of which one is medium-sized and two are only a minute spot.

(B) Black mark at medio-basal part of labrum (usually present as one of the specific characters). In 2♀ 5♂ the mark is lacking. In others: L(large) 32♀ 0♂, M(medium) 40♀ 1♂, S(small) 61♀ 9♂.

(C) Supraclypeal area (completely yellow as a rule). In the Lan-hsu population in a considerable number of the specimens the mark is reduced into a central mark, most usually triangular, sometimes quadrangular: Complete yellow: 74♀ 10♂, central mark: 60♀ 10♂ (L 24♀ 3♂, M 20♀ 1♂, S 16♀ 1♂), complete black: 1♀ 0♂.

(D) Scutellum (more often present in the Formosan specimens). Absent: 83♀ 10♂, present: 52♀ 5♂ (L none, M 21♀ 2♂, S 31♀ 3♂).

(E) Postscutellum (more often absent). Absent: 129♀ 11♂, present: 6♀ 4♂ (L 1♀ 0♂, M 1♀ 1♂, L 4♀ 3♂).

(F) Propodeum (more often present). Present: 45♀ 3♂, (L 1♀ 0♂, M 4♀ 0♂, S 40♀ 3♂), absent: 90♀ 12♂.

(G) Gastral tergites (usually 1: lateral marks, 2,3,4: a band, 5: a band or two spots, variable, 6 (♂) lacking or 1-2 spots). 1-4 complete: 54♀ 0♂, 1,2,4 complete and 3 interrupted: 80♀ 9♂, 1,2 complete and 3,4 interrupted: 0♀ 2♂, 1,2,4 complete (sometimes 4 interrupted in ♂) and 3 lacking: 1♀ 4♂.

(H) Sternites (at least on 2,3,4, as one of the specific characters). On 2,3,4,5: 72♀ 12♂ (5♂ further on 6); 2,3,4: 63♀ 2♂; no mark: 1♂.

Variation in morphology (cf. Tsuneki, 1971, p. 11).

The ocular index in ♀ (average of 8 specimens) 2.32 and in ♂ 2.66 (3 specimens), but the former is distributed over the range of 2.22-2.55 and the latter 2.53-2.67. While the clypeal index in ♀ 1.29 (1.15-1.37) and in ♂ 1.03 (1.00-1.08). The range of variation is too large to use them as specific characters at least in the Lan-hsu population.

The postero-lateral incisions of propodeum are also variable in depth. In ♀ Deep 31, Medium 83 and Shallow 21; in ♂ D 2, M 9 and S 4.

The form of the 2nd cubital cell is comparatively constant, in the greater part (♀ ♂) shortly petiolated above (123♀ 10♂), sometimes triangular (9♀ 3♂) (often in one side only) and more rarely quadrangular (3♀ 2♂).

Thus in the morphological characters examined no local variation can be found out.

Conclusion. Generally speaking, except for the frequency of the scutellar maculae which is reversed, the variation in maculation of the thorax-complex of the Lan-hsu population is similar to the case in the Formosan population. But the presence of the black mark on the clypeus is quite exceptional, though very rare in appearance. On the other hand, with respect to the gastral maculae the reduction of the mark on tergite 3 is very remarkable. It is very frequently divided into two lateral marks, with varying size and interspace, or turns into a series of small spots and in the extreme case completely disappears. It certainly shows a tendency towards the melanism, but at the present state it is not so much as to erect a local race.

Exceptional specimens. Of the exceptional specimens those bearing the clypeal black mark and that lacking completely the yellow mark on the supraclypeal area are in other respects normal or within the range of variation of the species. But the male specimen which lacks completely the ventral mark of the gaster is in many other respects abnormal. In this specimen the labrum is wholly yellow, the pronotal band is very narrow, short and remotely separated by interruption from each other, the axillae are very minutely and

faintly spotted with yellow, the scutellum, postscutellum and propodeum are completely immaculated and the labrum is wholly yellow. As to the gastral maculla the marks on tergite 1 become very small, the band on 2 is broadly interrupted into two medium-sized lateral marks, tergite 3 completely immaculated and 4 and 5 only with a small spot on each side. Moreover, in this specimen the pubescence covering the body is very scarce and the punctures are everywhere markedly sparse. But in this specimen the 2nd cubital cell is shortly petiolated and the ocular and clypeal indices (2.53 and 1.08) are within the variation range of the population.

Obviously the specimen deviates from the scope of variation of *B. hungaricus*. But I hesitate to give it a specific name, because it must be a causal mutant and soon absorbed by the original population, or else vanishes without reproduction (the specimen is the male!).

Bembecinus quadratus Tsuneki, 1976

Bembecinus pacificus Tsuneki, Etizenia, 31: 17, 1968, nec Turner 1917; *ibid.*, 56: 6, 1971; Haneda, Life Study, 15: 32, 1971; Murota, *ibid.*, 16: 5, 1972.

Bembecinus quadratus Tsuneki, Kontyu, 44: 434, 1976.

Specimens examined: 37 ♂♂, Lan-hsu (Botel Tobago): Hungtou and Tungching 6-9. VIII., T. Tano and T. Murota leg.

Variation in maculation (cf. Tsuneki, 1971, p. 18). In the females: Labrum (except for 3 that bear a small black mark) and supra-clypeal area are wholly yellow in all. Marks on scutellum: present in 34 (L 15, M 15, S 4) and absent in 4. Mark on postscutellum: present in 31 (L 10, M 15, S 6), absent in 6. Gastral tergites 1 and 2 as in the Formosan population. Tergite 3: one central mark 12, two lateral marks 5, three spots 13, a series of minute spots 5, complete band 1 and lacking 1. Tergite 4: complete band 35, medianly interrupted band 2. Tergite 5: complete band 7, three spots 20 two lateral spots 9, a series of minute spots 1.

Ventral marks of gaster: one pair (sternite 2) 17, two pair 2, completely lacking 16.

In the male specimens of the main island of Formosa the maculation is more variable than in the females. In the Lan-hsu population (9♂): Labrum and supra-clypeal area wholly yellow in all. Scutellum: present 2 (both small), absent 7. Propodeum: present 2, absent 7. Tergite 1: two marks in all. Tergite 2: a band 1, three spots 1, two spots 6, a series of fine spots 1. Tergite 3: three spots 1, two spots 1, lacking 7. Tergite 4: medianly interrupted band 6, two lateral spots 3. Tergite 5: a band 1, two broad mark 5, two lateral spots 3. Tergite 6 always immaculated.

Marks on sternites: two pair 2, one pair 3, lacking 4.

Variation in morphology. Postero-lateral incision of propodeum: D 3, M 16, S 15, almost lacking 3 in the females; D 1, M 5, S 3 in the males. Medio-basal impunctate area of propodeum: in ♀ wide 19, medium 12, narrow 6; in ♂ all wide. Median impunctate line of caudal tergite: in ♀ present 29, doubtful 4, lacking 2; in ♂ present 3, doubtful 6.

The 2nd cubital cell of fore wing is always quadrangular or pentagonal, having a part of its outline on the radial nervure, though more or less variable in length (♀ ♂).

Ocular index in ♀ (average of 12 specimens) 2.09 (2.00-2.21), in ♂ (3 specimens) 2.76 (2.65-2.82); clypeal index in ♀ 1.31 (1.22-1.41) and in ♂ 1.05 (in the main island specimens 2.25, 2.84; 1.25, 0.95 respectively).

Out of 35 female specimens 3 lack completely the yellow marks on the scutellum and propodeum. In other characters, however, they well agree with the other specimens and as the marks on both parts of the body are markedly

variable in this population they are considered to be at the extreme end of variation among them.

Conclusion. As to the maculation the reduction in size and frequency of appearance of the yellow maculae is considerably marked, especially in regard to those of the scutellum, propodeum and gastral tergites and sternites. But as to the morphology there is no local variation worthy of special mention.

Based upon the fairly marked tendency towards the melanism the Lan-hsu population of this species can be considered to form a distinct local ace:

Bembecinus quadratus lanhsuanus ssp. nov.

Holotype: ♀, Lan-hsu, Tungching, 8. VIII. 1976, T. Murota leg. (Coll. Murota).

Alysson pertheesi formosanus Tsuneki, 1968, stat. nov.

Alysson formosanus Tsuneki, Etizenia, 31: 4, 1968 (♀, Puli).

Specimens newly examined: 3 ♂, 5 ♀, Chuchi, Chiai Pref., 29-30. VII., T. Murota leg.

Remarks. In the female specimens of formosanus the difference in morphological characters from those of A. pertheesi occurring in Japan and Korea is hardly observed. In the male specimens, however, the antennae are distinctly thicker and shorter than in those of the compared populations. Thus, for instance, in formosanus joints 2-12 are almost as long as wide, at most even under the well stretched condition less than 1.2 times as long as wide, while, in the Japanese males joint 4 appr. 1.7 times, joint 7 appr. 1.5 times as long as wide at apex, all being longer than wide.

The colour of the specimens of this species is markedly variable as given in my papers on the Japanese (1973) and Korean (1974) representatives. But in the Formosan material some constant distinctions are observed. The females belong in colouration to forma rufa (Tsuneki, 1974), but gastral tergite 1 is on posterior part black. This colouration is constant among the 5 specimens observed. While, of the 5 male specimens one is forma nigra, 3 have more or less reddish areas on lower parts of the propodeum or at the base of tergite 1 and the remaining one has the same colouration as in the female. This richness in reddish colouration is counted as one of the local characters of ssp. formosanus.

The light marks on the head and its appendages are ivory white while the specimens are fresh. But after one or two years the colour turns into yellow. The fact must be kept in mind when one tries to compare the specimens from different localities.

Tachysphex from Lan-hsu Island

Tachysphex formosanus Tsuneki, 1971

Tachysphex formosanus Tsuneki, Etizenia, 55: 16, 1971.

Specimens examined: 1♀ 1♂, Lan-hsu: Hungtou, 6-9. VIII. T. Murota leg.; 2♀, Henschun, Pingtung Pref., 3-4. VIII., T. Murota leg.

Tachysphex mindorensis Williams, 1928

Tachysphex mindorensis: Tsuneki, Etizenia, 55: 14, 1971.

Specimen: 1♂, Lan-hsu: Hungtou, 6-9. VIII., T. Murota leg.

Tachysphex nigricolor lanhsuensis ssp. nov.

Differs from the typical race in that the punctures on frons much closer and finer, rugoso-subreticulate, with the microsculpture on the interspaces largely disappeared. Otherwise as in the typical race. Length 8 mm.

Holotype: ♀, Lan-hsu: Hungtou, 6-9. VIII., T. Murota leg. (Coll. Tsuneki)

Trypoxylon subpileatum Strand, 1922

Trypoxylon subpileatum: Tsuneki, Etizenia, 22: 3, 1967; *ibid.*, 54: 1, 1971.

Specimens examined: 3 ♀, Lan-hsu: Hungtou, 6-9. VIII., T. Murota leg.

Remarks. The specimens above listed were comparatively investigated in detail. In the relative length of IODs, antennal joints, gastral segments and so on they are essentially identical with the main island specimens. But they differ from these in that the punctures on the mesoscutum are constantly much finer and closer. Similar tendency is also observed on the head. The difference is very marked and seems to deserve a local race:

Trypoxylon subpileatum hungtouense ssp. nov.

Holotype: ♀, Hungtou, Botel Tobago Island, 6-9. VIII. 1976, T. Murota leg. (Coll. Murota).

Paratypes: 2 ♀, ditto.

Trypoxylon vallicola Tsuneki, 1971

Trypoxylon vallicola Tsuneki, Etizenia, 54: 6, 1971 (♀ ♂, Pempuchi); Murota, *Life Study*, 17: 117, 1973.

Specimens examined: 2♀ 2♂, Pempuchi, Nantou Pref., 29. VII., T. Tano leg.

Trypoxylon quadriceps Tsuneki, 1971

Trypoxylon quadriceps Tsuneki, Etizenia, 54: 12, 1971 (♀, Pempuchi).

Specimen examined: 1 ♀, Pempuchi, Nantou Pref., 25-28. VII., T. Murota.

Trypoxylon melanocorne Strand, 1922

Trypoxylon melanocorne: Tsuneki, Etizenia, 22: 11, 1967 (♀ partim); *ibid.*, 54: 5, 1967.

Specimen examined: 1 ♂, Pempuchi, Nantou Pref., 23. VIII. 1976, T. Murota leg.

In the original description of this species Strand certainly alluded to the male, but he mentioned only the body length and the colour of the abdomen, without any reference to the sexual distinctions. The following is the male characters brought to light by the observation of the above given specimen:

♂. Length about 11 mm. Generally darker than the female. Clypeus without apical ferruginous colouration, brownish yellow parts of palpi and legs dusky brown, especially basal rings of mid and hind tibiae darker and rather indistinct; gaster nearly wholly black, only tergites 1-3 slightly brownish beneath. IODs above and below 10 : 7, the former nearly as long as antennal joints 3 + 4, OOD : POD = 1 : 2, POD = ocellar diameter, supraantennal elevation nose-shaped, the carina on top not flattened at the anterior end to form a minute disc. Clypeus: Fig. 27, medianly weakly raised, apical reflection also weak, mandible without incision on inner margin. Antennal joints 3, 4, 5 with relative length 10, 7, 8, joint 3 in dorsal view 2.7 times as

long as broad at apex, joint 7 about 1.3 times so, ultimate joint (Fig. 28) not curved at apex, appr. as long as 3 preceding joints taken together, no incision nor protuberance on any of the flagellar joints beneath. Genitalia seen from beneath: Fig. 29, seen from apex: Fig. 30. Penis valve with sickle shaped processes before apex, paramere with main body thin and lamellate, rolled into subcylindric structure, apical lobe foliaceous, with apex shortly bifurcate. In fore wing radial cell with apex very close to the wingapex with R_1 as long as antennal joint 6 (if double the length it reaches just the wingapex).

Trypoxylon venustum sp. nov.

Trypoxylon koshunicon: Tsuneki, Etizenia, 13: 16, 1966 (♀ nec ♂)

♂. Very closely resembles T. koshunicon Strand, as far as the description goes, but can be separated from it by that the ultimate antennal joint is relatively distinctly longer and the legs slightly but essentially different in colour.

Length about 6 mm. Black, without plumbeous shine. Palpi and humeral tubercle pale yellowish white. Ferruginous to ferruginous yellow are antennal joints 1 and 2, both except upper side, apical margin of clypeus fairly broadly, mandible (apical portion dark), tegula (semitransparent), basal plates of wing, fore leg from apex of coxa apically except a black streak on femur in front, mid leg from apical half of coxa apically and hind leg: apical half of coxa, trochanter wholly, both ends of femur narrowly, basal ring of tibia, base and apex of tarsal joints 1-3 and whole of 4. Arolia of all legs black, but claws pale. In fore and mid legs femora above, tibiae externally and apical 2 or 3 tarsal joints slightly darkened, tibial spurs of fore leg at apex and of mid and hind legs totally black. Wings hyaline, stigma and veins dark brown.

Head seen from above: Fig. 31, seen in front: Fig. 32, IOs above (\cong antennal joints 4+5+6) and below 3 : 2, OOD : POD = 1 : 2, POD \div postocellar diameter, supraantennal elevation nose-shaped and carinated on top, the carina appr. $2/5$ of the distance to median ocellus and at the upper end deeply incised and at the lower end crossing the interantennal transverse carina and shortly extended between the antennal socket rims. Clypeus (Fig. 33) medianly broadly and very weakly raised, mandible without notch on inner margin. Antennal joints 3 and 4 with relative length 10 : 7, joint 3 in dorsal view 2.7 times as long as broad at apex, 7-12 wider than long, ultimate joint nearly as long as 3 preceding joints united (Figs. 34 and 35, seen in somewhat different direction) and apically bent (Fig. 36). Collar of pronotum posteriorly discoloured, side with ventral protuberance bluntly rounded, mesopleural scrobe very large and deeply concave. On propodeum area dorsalis distinctly margined by fine groove, medial furrow comparatively broad. Petiole socket (Fig. 37) featureless, gastral tergites 1-3 in dorsal view: Fig. 38, segment 1 as long as hind tibia, in lateral view: Fig. 39; sternites 7 and 8 (inner one) seen from above (= from inside): Fig. 40, paramere of genitalia with apical part deeply bifurcate (Fig. 41, from outside), basal part lamellately expanded and rolled (in the course of preparation the genital organ is broken and main parts were lost).

Frons finely closely punctured, with intervals slightly smaller than puncture diameter and microcoriaceous, on vertex punctures somewhat smaller and sparser, mesoscutum and scutellum more finely and more closely punctured than on frons, under high magnification punctures are connected with each other by fine impressed lines (puncture-interspaces thus not microcoriaceous), mesopleuron smooth and polished and rather sparsely covered with very minute hair bearing points, metapleuron and side of propodeum hairless, smooth and shin-

ing, the latter posteriorly and upwards with sparse fine punctures. Dorsal aspect of propodeum on area dorsalis at base obliquely and posteriorly gradually transversely striate, the striae weaker posteriorly and on apical nearly flattened part of medial furrow almost smooth and polished, on outer sides of the area and on posterior aspect posteriorly finely moderately closely punctured. Gaster sparsely covered with hair-bearing punctures, the hairs on dorsal side of petiole finer and shorter, on the succeeding segments fairly long.

♀. Already described in detail.

Holotype: ♂, Pempuchi, Nantou Pref., 23. VIII. 1976, T. Murota leg. (Coll. Tsuneki).

Paratype: ♀, the same place, 29. VIII. 1976, T. Tano leg.

Other specimen: 1 ♀, Kentin Park, Pingtung Pref., 4. IV. 1965, T. Shirozu leg. (Coll. Kyushu Univ.).

Remarks. The female of the present species was first described as the female of *T. koshunikon* Strand. In those days the known species of *Trypoxylon* of Formosa were only a few and the close resemblance of the characters tempted me to combine the two together. But now it has been made clear that there are several species that are very similar to *koshunikon*. Therefore, the sexing has to be made prudently. The female above mentioned is far closer to the male of the present species in the detailed colouration of the legs than to *koshunikon* and it is determined to shift it to the present species.

Trypoxylon planifrons sp. nov.

The present species (♂) is very characteristic in that the frons is flattened, almost not elevated and only microcoriaceous without puncture, the propodeum has the area dorsalis very weakly indistinctly outlined and almost not elevated, with the central area broadly flattened and the gastral tergite 1 is broad and long, subsylindric and the following segments are also long and slender.

♂. Length about 7 mm. Black and dull, without plumbeous shine. Clypeus bright orange yellow, with apex brown; palpi dark brown, with articulations broadly ferruginous; tibial spurs ferruginous, in front leg apically fuscous, in mid leg pale brown and in hind leg apically brownish, fore and mid tarsal joints dark brown, with articulations ferruginous. Wings hyaline, apically slightly darkened, but the apical margin with a certain breadth distinctly paler (quite strange). Hairs on lower inner orbits (not on eye incisions), clypeus and supraclypeal area appressed and silvery, on other parts of body not rich, short, whitish, not conspicuous. Gastral sternites 2-7 each with a line of erect hairs, on 2-4 short, weak, but on 5-7 gradually longer and stronger posteriorly.

Head seen from above: Fig. 42, with surface flattened, only slightly impressed at the outside of each ocellus, OOD : POD = 1 : 3, POD = postocellar diameter. Head seen in front: Fig. 43, IODs above and below subequal in length, eye incisions markedly shallow and wide and frons as much broadened, only gently lowered along inner orbits below eye incisions, without frontal furrow, supraantennal elevation almost none, only the extension of the frons with the median carina only under high magnification and in oblique light as a very very fine weakly raised line defined, it runs till one third the length to the median ocellus and ended in a small oval glittering impression which is well defined even under the lupe; without interantennal transverse carina, without inner-dorsal elevation of the antennal socket rims; clypeus broadly, very gently raised on the disc, its anterior margin: Fig. 45, supraclypeal area flattened, rather slightly depressed. Head seen in profile: Fig. 44, occipital carina higher downwards and suddenly ended at apices but not toothed. Palpi comparatively long, apical 3 joints subequal in length, each appr. 7-8 times as long as wide in middle. Antennal joints 2-13 seen from the side

gently roundly swollen beneath and seen from beneath (Figs. 46 and 47) with joints 3-13 longitudinally finely furrowed (on 13 till middle) and the narrow area along the furrow including the furrow itself ferruginous in colour and accompanied by a series of whitish pubescence, the ferruginous colour gradually darkened towards apex and on ultimate joint less conspicuous, the furrow on joints 6-13 very acutely margined, but on 3 and 4 weaker and less distinctly outlined, ultimate joint only slightly longer than the penultimate and roundly attenuate apically and pointed at the tip (Fig. 48). Collar of pronotum: Fig. 49, posterior area behind the transverse furrow not discoloured, latero-ventral process of pronotum very obtuse, with apex broadly rounded not conspicuous. Mesoscutum with lateral and postero-lateral marginal carinae higher than usual and scutellum also highly raised in accordance with the carinae, postscutellum also highly elevated. On propodeum area dorsalis indistinctly outlined by feeble impression, but posteriorly the impression becoming a weak furrow, disc medianly broadly flattened, without furrow, but the lateral carina at the upper edge of the side distinct and acute, accompanied with a fine groove inside, on posterior aspect of propodeum medianly broadly furrowed. Socket rim of gastral ligament a simple transverse band, not produced posteriorly in middle, smooth and polished. Gastral segments 1, 2, 3: Fig. 50, the form of petiole is very characteristic, in lateral view: Fig. 51, 8th sternite: Fig. 52. Genitalia seen from beneath: Fig. 53, paramere deeply splits into two broad elongate lobes, carrying short stiff hairs on the opposed surface, the bases of which appear as scattered dots from outside, the organs seen from the side: Fig. 54, seen obliquely from the back: Fig. 55. In fore wing radial cell with apex not reaching close to the wing apex, with R₁ slightly less than as long as hind tarsal joint 3.

Frons, vertex and thorax wholly very weakly delicately microcoriaceous half mat, under high magnification the meeting points of fine impressed lines slightly enlarged into minute punctures; the sculpture on vertex weaker, in part obliterated, with the surface shining, on mesopleuron slightly larger, weaker, surface also fairly shining. Propodeum on dorsal aspect with medio-basal area broadly finely (but more largely than on other areas) irregularly reticulate, with latero-basal areas obliquely finely closely rugoso-reticulate, remaining area delicately transversely closely rugoso-reticulate, posterior aspect transversely finely closely striate, partly also rugosely so, the striae slightly sparser posteriorly; lateral carinae distinct and accompanied by a largely foveolate furrow, along the furrow transverse striae somewhat stronger and well defined; sides of propodeum antero-ventrally smooth and polished, remaining area obliquely, very finely and closely striate. Gastral tergites closely covered with pile-bearing micropoints, the points on posterior segments slightly larger, on tergites 1-3 main part of disc covered with transverse very fine close delicate striae and the surface dull and opaque, only on posterior portion of each tergite the sculpture weaker and sparser, with the surface somewhat shining.

♀, unknown.

Holotype: ♂, Wushe - Pihu, Nantou Pref., 21-23: VIII. 1976, T. Murota leg. (Coll. Tsuneki).

Trypoxylon takasago Tsuneki, 1966

Trypoxylon takasago Tsuneki, Etizenia, 13: 11, 1966 (♀).

Specimen examined: 1 ♂, Pempuchi, Nantou Pref., 19. VIII. 1976, T. Murota leg.

♂ (hitherto undescribed). Length 7.5 mm (possibly a small specimen). In colour and pilosity similar to the female, only the pale parts of mid and hind tibiae slightly darker and less distinct. In structure and sculpture com-

pletely agrees with the description of ♀, except the following:

IOD at vertex, as compared with head width relatively slightly broader, in ♀ $MD : IOD = 4 : 1$, in the present ♂ $3 : 1$, but the ratio of IODs above and below similar, namely, $5 : 4$, supraantennal carina simple above and below as in paratype ♀ (in holotype incised above), reaching about one fourth of the distance to anterior ocellus. Antennal joints slightly shorter, joint 3 about 1.5 times as long as joint 4 and 2.5 times (in ♀ thrice) as long as wide at apex, ultimate joint 2.5 times (in ♀ twice) as long as wide at base, much thicker than in ♀ and as long as 3 preceding joints taken together. Area dorsalis on propodeum with lateral furrows much weaker, only in oblique light defined with some difficulty, especially on posterior half (contrary to the usual case).

Some supplementary notes. Frons broad, elevated area heart-shaped, flattened, only in front of anterior ocellus weakly furrowed for a short distance. Supraantennal elevation low, rounded, not nose-shaped. The surface of frons distinctly, somewhat strongly microcoriaceous and closely interposed with fine punctures, the punctures sparser upwards and on vertex the surface becomes somewhat shining. Thorax-complex apparently smooth and polished, under high magnification very fine weak sparse hair-bearing punctures defined. In fore wing radial cell as in ♀, R_1 slightly less in length than hind tarsal joint 3 and reaches almost apex of the wing.

Genitalia in ventral view: Fig. 56, in lateral view (somewhat from above) as in Fig. 57, 8th sternite: Fig. 58.

Psen (Psen) tanoi Tsuneki, 1967

Psen (Psen) tanoi Tsuneki, Etizenia, 24: 6, 1967 (♀ ♂, Mt. Ali).

Specimen examined: 1 ♀, Wushe, Nantou Pref., 30. VII., K. Sabi leg.

Psenulus ornatus pempuchiensis Tsuneki, 1971
A Variety

Psenulus ornatus pempuchiensis Tsuneki, Etizenia, 57: 3, 1971 (Pempuchi).

Specimen: 1 ♀, Lih-yueh-tan, Nantou Pref., 23. VII., K. Sabi leg.

Differs from the typical specimen only in colour as follows: On mesoscutum lateral marks longer, medial marks shorter and much more broadened at the apex; axillae completely black; scutellum wholly yellow and medianly longitudinally striped with black. No yellow mark on the upper part of prepectus behind humeral tubercle. The mark on the posterior aspect of propodeum is not a pair of broad U-shaped marks, but a single broad U-shaped one in the middle. Marks on thorax-complex are as given in Figure 59 (cf. Tsuneki, 1971, Fig. 4). Brown stripes of all femora weaker, in fore leg almost none and in mid and hind legs very feeble.

Remarks. In the ornatus-group of Psenulus the specimens having such a degree of difference in maculation as pempuchiensis s. str. and the present specimen are used to be dealt with as different species, e.g. P. elegans, pseudajax, tristis etc. I think these to belong to the same species, at most to be the local variations, because, as far as their descriptions go there is no morphological differences between them that are considered amply specific.

Psenulus carinifrons rohveri Van Lith, 1962

Psenulus carinifrons rohweri Van Lith, Zool. Verh., 52: 108, 1962.

Psenulus carinifrons rohweri: Tsuneki, Life Study, 17: 45, 1973 (Formosa).

Specimens examined: 2 ♀, Wushe, 21-23. VII; 2 ♀, Pempuchi, 25-28. VII, T. Murota leg.; 17 ♀ 8 ♂, Lan-hsu Island (Hungtou), 6-9. VIII, T. Tano and T. Murota leg.

Remarks. In the specimens from Wushe scutellum and postscutellum wholly yellow, hind tibia more than basal half yellow. In those from Pempuchi one has the scutellum partly and postscutellum on median spot only yellow, but its hind tibia more than half yellow, while in the other scutellum and postscutellum wholly yellow, but its hind tibia less than basal half yellow.

In the Lan-hsu specimens 5 ♀ have the hind tibia less than half yellow.

Polemistus formosus (Tsuneki, 1967)

Passaloeocus formosus Tsuneki, Etizenia, 24: 10, 1967 (Fenchihu); *ibid.*, 57: 13, 1971 (Kansitaku).

Specimens examined: 193♂, Wushe, Nantou Pref., 21-23. VII., T. Murota leg.

♂ (hitherto undescribed). Differs from ♀: (1) Head in dorsal view with inner orbits parallel (in ♀ divergent anteriorly). (2) Head in frontal view with face slightly narrower, IODs above (at the posterior margin of median ocellus) and below relatively 20 : 10 (in ♀ 20 : 12, in both head width relatively 35). (3) Clypeus on anterior margin not markedly produced anteroventrally, but only very weakly produced (Fig. 60). (4) Mandible with upper broad tooth comparatively narrower. (5) Antennal joints 2-10 bright ferruginous beneath (in ♀ brown to dark brown), flagellar joints relatively slightly longer and 3-10 weakly rounded out beneath. Otherwise as in ♀.

Stigmus murotai sp. nov.

The present species is similar in the form of the clypeus to S. japonicus m., but is different therefrom in the form of the head seen from above, in the sculpture of hypoepimeral area of mesopleuron and in the characters of pygidial area. Amongst the Formosan congeners it is somewhat close to S. shirozui alishanus m., but is easily separable from it by the morphology of clypeus, antenna, mesothorax and pygidial area and in the colour of pronotal tubercle. It is characteristic in that the inner orbital furrows comparatively well developed (approaching Carinostigmus), occipital furrow deep and strongly foveolate, mesoscutum posteriorly strongly striate and pygidial area comparatively broad and coarsely punctate. Further, the form of the clypeus and the sculpture of mesopleuron and the colour of the pronotal tubercle are also of use to distinguish it from other related species.

♀. Length 3.5-4.0 mm. Black and shining; ferruginous are antenna (from joint 5 apically above brown to black), mandible except apex, anterior margin of the neck of pronotum, apices of all coxae, all trochanters largely or wholly, base and apex of all femora, fore and mid tibiae, hind tibia at base broadly (outer side narrowly dark brown) and all tarsi except brownish apical joints. Tegra of wing transparent pale yellow, appearing dark brown due to the colour of the under locating basal plates of the wing; wing hyaline, stigma black, but basally colourless and apically pale brown, veins pale ferruginous, subcosta and apex of RS dark brown. Body almost wholly glabrous, with hairs very sparse and short.

Head from above, in front and in profile: Figs. 61, 62 and 63. OOD : POD 5 : 3.5 (HW 35), POD = postocellar diameter, frontal fovea nearly rounded,

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consisting of a collection of 3-4 short impressed lines, located on oculo-cellular area, each ocellus fairly steeply inclined outwards, having narrow impression at the outer periphery, frontal furrow very fine and weak, IODs above (at anterior margin of postocelli) and below relatively 20 : 15, scapal hollow deep, but not well outlined, provided with a vestigial minute tubercle medianly below middle, but not spined; clypeus gently tectinate, with apical toothed area strongly reflected, mandible tridentate at apex, the medial tooth larger. Occipital carina suddenly ended at the posterior ridge of stomal hollow, but not toothed, outer orbital furrow fine, on lower part finely crenulate, oculomandibular space very short. Antennal joints 3, 4, 5 very slightly reducing in length apically, joint 3 appr. 1.5 times as long as wide at apex. Collar of pronotum short, anteriorly and laterally strongly carinated and acutely angulated at antero-lateral corners; mesoscutum with notauli attaining to the posterior margin, with the medial part shortly weaker and less distinct, but anterior 2/5 deep and strongly foveolate. On mesopleuron omaulus low and weak, but the anterior margin if episternal furrow strongly carinated, on mesosternum acetabular carina high, roundly emarginate, median longitudinal carina attenuate posteriorly. Propodeum in dorsal view: Fig. 64, posterior view: Fig. 65 and in lateral view: Fig. 66; dorsal aspect medio-posteriorly with a comparatively broad and deep hollow which is flattened at the bottom and polished, from here a short furrow runs posteriorly till the top of perpendicular enclosed area (Fig. 65) which is longitudinally roundly excavated. Gastral petiole appr. as long as 1st tergite, 3/4 the length of hind femur, distinctly thickened towards apex. Pygidial area: Fig. 67. Wing venation and legs normal, hind tibia with strong spines on outer side as in *shirozui alishanus*.

Vertex, upper frons, clypeus and temples smooth and polished, with fine punctures very sparsely scattered, punctures on clypeus slightly larger, temple below transversely striate, the striae slightly longer and closer above the mandibular base. Collar of pronotum longitudinally coarsely striate, tubercle above longitudinally finely closely, but not strongly striolate, lateral aspect except the smooth anterior surface of tubercle longitudinally strongly coarsely striate, with intervals weakly crenate. Mesoscutum, scutellum, due to very delicate microsculpture, not so strongly shining as the head, with sparse, slightly large, longitudinally elongate punctures scattered, posterior portion between notauli longitudinally coarsely striate the striae individually variable in length; scuto-scutellar furrow coarsely foveolate, scutellum medianly with a weak impressed line; on mesopleuron all the furrows, including precoxal, posterior mesopleural furrows, very coarse-foveolate; hypoepimeral area longitudinally finely closely striolate, the striae weaker below, while triangular area smooth and polished, on mesosternum acetabular furrow also strongly crenate, medial longitudinal carina on both side costate; metanotum mat and metapleuron highly polished. Sculpture pattern of propodeum: Figs. 64 and 65 (posterior view), side on dorso-posterior half coarsely reticulate, remaining area smooth, shining and obliquely delicately striolate. Petiole longitudinally strongly coarsely carinate (dorsal side tricarinate), with interspaces microshagreened, tergites smooth and polished, sternite 6 finely closely punctured, half mat.

♂. Except for the sexual characters very similar to ♀, differing in the following characters: Head seen from above with temples much less developed, lateral margins more strongly convergent posteriorly, width at the occipital carina relatively smaller (ratio to HW 35 : 22, in ♀ 35 : 24), seen in profile temple narrower. Mandible bidentate at apex, the lower tooth longer. Antenna slightly finer.

Holotype: ♀, Pempuchi, Mantou Pref., 19. VIII. 1976, T. Murota leg.

(Coll. Tsuneki).

Paratypes: 1 ♀ 1 ♂, ditto; 1 ♀, the same place, 21-23. VIII. 1976, T. Murota leg. (Coll. Murota).

Other specimens: 13 ♀ 2 ♂, the same place, 27. VII. 1976, T. Tano leg.

Carinostigmus nozakai sp. nov.

Closely resembling *C. saigusai* m., but can be separated from this by the form of the clypeus and by the colour of the mandible, antennal scape and legs. The lustreless mesoscutum is also characteristic.

♂. Length 4.5 mm. Black and shining, mesoscutum and scutellum lustreless. Semitransparent ferruginous are basal 4 joints of antenna (joint 1 internally, 3, 4 above and 5, 6 beneath brownish), mandible except reddish brown apex, tegula and basal plates of wing, apices of coxae, trochanters, both ends of all femora (in hind legs narrowly), fore and mid tibiae largely, hind tibia at base broadly, tibial spurs and fore and mid tarsi except apical joints; rest of antenna, femora and hind tibia dark brown, fore and mid tibiae medianly and hind tarsus wholly castaneous brown. Pronotal tubercle ivory white, but anteriorly dark brown. Wings hyaline, stigma and veins dark brown. Hairs very scarce, greyish white.

Head from above: Fig. 68, OOD : PDD = 7 : 3, width of postocellus relatively 3, each ocellus externally inclined, having an impression at its outer side, frontal fovea a small impressed point on oculocellar line close to eye, without frontal furrow. Head seen in front: Fig. 69, downwards development of eyes marked, ratio of OODs above (at anterior margin of anterior ocellus) and below appr. 5 : 3, frons medianly carinated and spined above the antennal base, the spine short, truncate at apex. Clypeus with disc gently roundly raised, apical margin slightly produced only in middle where bluntly tridentate (Fig. 69), mandible bidentate at apex, lower tooth longer. Antenna slender and long, from joint 2 apically to penultimate joint gradually slightly reducing in length and increasing in thickness, joint 3 thrice, joint 12 1.7 times as long as wide at apex, flagellar joints covered with short pubescence, somewhat longer on the underside. Head seen in profile: Fig. 70. Collar of pronotum medianly as long as antennal joint 3, with a broad trapeziform elevation in middle, anteriorly strongly carinated and acutely toothed at the corners. On mesoscutum notaulus deep, crenate, but not reaching middle of scutum, admedian area longitudinally broadly elevated and margined on both sides by parallel impressed lines (posterior portion broadly damaged by the needle); on mesopleuron scrobal furrow weak, anterior part alone defined. Propodeum (Fig. 71) in lateral view with dorsal line roundly curved (Fig. 72). Petiole long, slender, slightly widened towards apex, as long as hind tibia and appr. 9 times as long as wide at middle. Legs and wing venation normal to the genus, hind tibia without spine on outer side.

Vertex and upper frons smooth and polished, with very minute and very sparse hair-bearing point scattered, lower frons microcoriaceous, half mat, at the sides of frontal spine coarsely costate, clypeus at base half mat; temple below transversely fairly closely striate (Fig. 70), mesoscutum on anterior portion very delicately striolate, half mat, scuto-scutellar furrow distinctly foveolate, scutellum medianly with a longitudinal impressed line, postscutellum longitudinally closely striate; mesopleuron on hypopleural area longitudinally finely closely striate, each furrow strongly crenate, precoxal area broadly arcuately finely closely striate. Sculpture of propodeum: Fig. 71, sides with dorsal and posterior areas coarsely irregularly reticulate and anteriorly obliquely unevenly striate. Gastral petiole and tergites smooth and shining, sternites with a few scattered fine punct-

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♀, unknown.

Holotype: ♂, Pempuchi, Nantou Pref., 30. VII. 1971, leg. Chizuko Nozaka.

Remarks. Mandibles are more yellowish than other similarly coloured area and much less transparent. Mesoscutum characteristically half mat, but on the lateral areas, especially on antero-lateral portions smooth and polished. Petiole under high magnification with a shallowly impressed line along each lateral margin, the surface of the impressed area finely striolate.

Carinostigmus tanoi sp. nov.

The present species (♂) is apparently similar to the preceding nozakai, but is different therefrom mainly in the form of clypeus, in the colour of antenna, in the larger body size and in the lustreless vertex and mesopleuron. The mat vertex and mesothorax enable us to separate it easily from the other congeners.

♂. Length 5.5 mm, much **robuster** than nozakai which is **very slender**. Black; semitransparent ferruginous (slightly darker than in nozakai) are mandible (apex reddish), labrum, palpi, tegula and basal plates of wing, fore and mid legs except medial greater part of femora, all tibial spurs and following parts of hind leg: apex of coxa, trochanter, both ends of femur narrowly, basal 2/5 of tibia and whole tarsus. Antenna castaneous brown, apically darker, basal portion semitransparent and fuscous above. Wings hyaline, stigma and veins castaneous.

Head from above: Fig. 73, with sides behind eyes relatively longer than in nozakai and more strongly roundly convergent posteriorly, with occipital area much narrower; frontal furrow, ocellar location and their outer impressions similar, OOD : POD = 8 : 3. Head seen in front: Fig. 74, frontal spine moderately long and truncate ap apex, clypeus distinctly produced anteriorly, medio-apical summit comparatively broad, very bluntly tridentate, disc distinctly roundly elevated, labrum as given in the figure. Head seen in profile: Fig. 75, occipital carina more roundly curved than in nozakai, completely encircling the foramen, but much lower in height at the underside behind stomal carina than in nozakai. Antennal joints relatively longer than in this, very slightly shorter and thicker apically, joint 3 appr. 3.3 times and joint 12 appr. 1.7 times as long as broad at apex. Pronotum: Fig. 76, at middle less than as long as antennal joint 3, mesoscutum with notauli strongly foveolate, reaching about middle of the scutum, admedian area comparatively broad, margined on each side by a fine carina, parapsidal suture curved short furrow, not foveolate, postscutellum with a distinct median impressed line; on mesopleuron scrobal furrow indistinct, other furrows strongly foveolate. Propodeum similar in structure to that of nozakai, dorsal curvature in lateral view also similar. Petiole appr. as long as tergites 1 and 2 united, slightly shorter than hind tibia (8 : 9), posteriorly slightly widened, tergite 1 slightly shorter than wide (4 : 5, in nozakai slightly longer than wide). In fore wing cubital cell 2 slightly wider than high (in nozakai as wide as high); hind tibia not spinose on outer side.

Vertex delicately microrugulose, mat, only on small areas obliquely in front of anterior ocellus smooth, the surface very sparsely scattered with fine punctures, frons medianly from anterior ocellus to antennal base distinctly carinate, with surface rather strongly, partly longitudinally microcoriaceous, mat, on lower portion below the frontal spine transversely, arcuately coarsely striate. Clypeus more finely delicately microcoriaceous. Temple on upper portion transversely finely closely microstriate, the striae more distinct below and behind mandibular base very distinct and fairly str-

ong. Pronotum not mat, medial oblong area of collar with a broad V-shaped carina (constant?), lateral inclined areas longitudinally striate, with a large fovea inwards, lateral aspect of pronotum longitudinally strongly striate. Mesoscutum on anterior portion transversely microstriate, under 64 times magnification distinct and fairly strong, on posterior portion and postscutellum simply mat, without observable structure, whole the surface scattered with fine punctures very sparsely. On mesopleuron hypoepimeral area longitudinally finely closely striate, triangular area anteriorly smooth and polished, posteriorly longitudinally striate, remaining areas of episternum and mesosternum obliquely closely striate, the striae posteriorly (before metapleuron) strong and distinct, but anteriorly weak and mixed with coriaceous sculpture indistinct. Sculpture of propodeum generally as in nozakai, but on medial area of dorsal aspect much coarser (Fig. 77). Petiole with dorsal side scattered with short weak longitudinal strioles, somewhat stronger basally, tergites under low power smooth and polished, under high magnification transversely delicately closely microstriate; sternites finely sparsely punctured.

♀, unknown.

Holotype: ♂, Pempuchi, Nantou Pref., 29. VII. 1976, T. Tano leg. (Coll. Tsuneki)

Ectemnius (Cameronitus) laevidorsis sp. nov.

The present species (♂) has the head and thorax smooth and polished, with fine punctures sparsely scattered. Further, the antennal structure is similar to that of the members of Hypocrabro. In these respects the species is exceptional to the subgenus and to include it within Cameronitus the category of the subgenus must slightly be enlarged.

♂. Length 7.5-8.0 mm. Black, with plumbeous shine on mesoscutum and mesopleuron. Yellow are antennal joint 1 in front and on outer side, (mandible wholly black), a medianly narrowly interrupted band on pronotal collar, tubercle, axilla, two comparatively large marks on scutellum (interspace as wide as the mark), postscutellum, a mark on upper part of prepectus behind tubercle, a comparatively small mark on each side near apex of gastral tergite 1, the same in middle of 2, 3 and 4 (in size 2>1,3>4), a curved mark from apex to underside on anter margin of fore and mid femora, all tibiae on outer side (in hind tibia narrow), two basal joints of fore tarsus and metatarsus except base of mid leg. Ferruginous: a line on antennal joints 2-6 beneath, palpi, tegula of wing, fore and mid femora above and beneath, fore tibia in front and apex, apex of mid tibia, all tibial spurs underside of fore and mid tarsi; rest of tarsal joints dark brown to brownish black. Wings hyaline, stigma and veins dark brown. Hairs on sides of scrobal hollow and clypeus silvery, pubescence on the rest of head long, rather sparse, on thorax and propodeum long but sparser, silky white, fairly ferruginous on dorsal side, pubescence on gastral tergite 1 long, slightly stiff, on others somewhat shorter, everywhere not dense, silky white.

Head from above transverse, ratio of width to length appr. 6.5 : 4, temple roundly convergent posteriorly, occipital margin gently roundly emarginate, surface almost flattened and broadly, not strongly depressed on outer side of each ocellus, frontal furrow very shallow and broad, ocelli in a right-angled triangle, OOD : POD : OCD = 5 : 3 : 6, postocellar diameter relatively 2.8, a weak impressed line from between postocelli posteriorly present, orbital fovea indistinct.

Head seen in front: Fig. 78, minimum IOD at above antennal socket appr. one third the length of antennal scape which is sharply uncarinate at antero-external corner. Clypeus: Fig. 79, mandible bidentate at apex, with a stout

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with a stout

tooth on inner margin close to the basal condyle. Head seen from beneath with occipital carina reaching fairly close to hypostomal carina, gradually lowering at the ends. Antenna seen from above: Fig. 80, joints 3-6 beneath on the ferruginous line with acute tyloidea, joints 3 and 4 gently, 5 fairly markedly swollen out posteriorly and 6 strongly excavated at base and acutely produced at apex, joints 7, 8, 9 also slightly produced at apex. Collar of pronotum on antero-lateral corners rounded, without carina on anterior margin and medianly deeply narrowly incised; mesoscutum with a fine admedian line which is margined on each side with a fine impressed line, less than half the length of the scutum, scuto-scutellar suture, strange enough, not the usual transverse furrow, but on medial third represented by a fine impressed line and on lateral third widened into a short furrow, this is due to the rounded expansion of the posterior margin of the scutum, while post-scutellar furrow normal, finely crenate. Mesopleuron with precoxal carina distinct. Area dorsalis on propodeum enclosed at the posterior part distinctly and at the lateral parts rather indistinctly and somewhat intermittently with fine carinae, the carina anteriorly not defined, disc of the area obliquely, moderately closely rugoso-striate, lateral propodeal carinae thorough and distinct, posterior aspect with medial impression large, oviform, attenuate apically and replaced by a carina, on both sides of which the surface roundly impressed. Gastral tergites 1 and 2: Fig. 81, tergite 1 in vertical view: Fig. 82, all the segments in lateral view: Fig. 83, pygidial area: Fig. 84. Fore coxa with a broad rounded expansion at the posterior margin, the following trochanter acutely carinated beneath and femur also carinated on posterior margin at basal third, mid tibia with a row of 4 short spines on apical part of postero-external edge, hind tibia also with a row of sparse short spines on external side, but on apical third no spine; metatarsi long, in fore leg twice as long as the remaining tarsal joints united and in mid and hind legs distinctly longer than the rest of tarsus; hind tibial spurs comparatively thick, excavated on inner side, the longer one about half the length of the following metatarsus. In fore wing abscissa 1 of cubital vein thrice as long as 2, that of radial vein slightly more than half the length of 2.

Vertex and upper frons finely and very sparsely punctured with hair-bearing points, punctures on anterior verge and on lower frons larger and stronger; mesoscutum, scutellum and mesopleuron punctured as on vertex, metapleuron on lower part longitudinally closely striate. Area dorsalis at base shortly coarsely striate, disc shining, with very minute sparse hair-points scattered anteriorly and medianly with 3 slightly divergent fine carinae instead of the furrow, broad marginal area obliquely sparsely striate, mixed with indistinct punctures; on posterior aspect lateral areas transversely coarsely striate and medial impression with bottom furrow coarsely crenate, sides longitudinally, very finely densely striate; gastral tergites wholly and sternite 2 finely sparsely punctured, tergites 3-6 basally smooth and polished, and apically covered with minute hair-bearing punctures.

♀, unknown.

Holotype: ♂, Mushe - Pihu, Nantou Pref., 21-23. VIII. 1976, T. Murota leg. (Coll. Tsuneki).

Paratypes: 2 ♂, the same data (Coll. Murota).

Remarks. Sternites 3 and 4 of the present species (♂) are provided near base on each side with a transverse aperture which is caved in anteriorly, like a shallow pocket, quite strange structure, not known on other crabronine wasps.

Crossocerus (Cuphonterus) flavonictus (Smith, 1856)

Crossocerus (Cuphopterus) flavopictus: Tsuneki, Etizenia 51: 12, 1971 (ssp. kansitakuanus).

Crossocerus (Cuphopterus) flavopictus: Leclercq, Bull. Ann. Soc. R. Belg. Ent. p. 291, 1973.

Specimens examined: 2 ♀ 10 ♂, Wushe - Pihu, Nantou Pref., 21-23. VIII, T. Murota leg.

Remarks. The female specimens above listed differ from that captured at Kansitaku, midway to Mt. Ali, and redescribed by me previously in that the clypeus is broadly yellow maculated. This is exceptional to the species, because in all the specimens hitherto dealt with the clypeus is wholly black. However, in the male specimens examined varied degrees of development of the yellow maculae are observed on the clypeus and the instances of wholly black are rather rare.

♂ (hitherto undescribed). Length 8.0-9.5 mm. Colouration similar to ♀, except that tergite 5 immaculated and instead tergite 6 maculated with two spots. Clypeus in 3 out of 10 specimens broadly yellow as in ♀, in 1 wholly black and in the others with two marks of various development.

General structure of the head, mandible, antenna and legs are as in the allied species of the subgenus. Some specific distinctions: Ocellar area (ocelli in an isosceles triangle, slightly lower than equilateral one) longitudinally keeled between postocelli, inner orbital fovea not impressed, defined by the deep black in plumbeous lustre of the surrounding area, lying from the outer side of postocellus through oculocellar area to inner orbit, first linear, curved and then enlarged into elongated oval. Clypeus slightly varied in form (Figs. 85, 86 and 87), with the median line bluntly keeled. Antennal flagellum fringed with short curved pubescence beneath, joint 3 1.7 times as long as wide at apex, joint 7 as long as wide; mandible with a broad tooth (but acute at apex) on inner margin in middle, strongly excavated on outer side. The furrow before and behind scutellum both finely crenate; area dorsalis on propodeum well enclosed by fine groove, at base crenate and in middle broadly furrowed, lateral propodeal carinae at the posterior aspect strong and well defined, but at the dorsal aspect disturbed by the rugosity outside the area; disc of the area and both sides of medial large furrow of posterior aspect smooth and polished, the latter posteriorly rugulose and medianly keeled.

Crossocerus (Alicrabro) breviclypeatus sp. nov.

Differs from C. (Alicrabro) rufiventris in the structure of clypeus, antenna, propodeum, in the sculpture of mesoscutum and in the colour of gaster. Further, gastral segment 1 slightly shorter, legs more brightly maculated and body much smaller.

♀. Length 5.5-6.0 mm. Black with weak plumbeous shine on mesoscutum and mesopleuron. Cream or orange yellow are antennal joint 1 wholly, 2 at apex and beneath, outer side of mandible, palpi, collar and tubercle of pronotum, lateral carinate parts of scutellum, postscutellum with its lateral carinae and following part of legs: fore leg: trochanter beneath, from apical third of femur till apex; mid leg: apex of coxa, trochanter wholly, apical half and underside of femur, tibia and tarsus; hind leg: greater part of coxa, trochanter wholly, apex of femur and base and outer streak of tibia. Fore and mid tarsi slightly ferruginous, somewhat strongly so on apical joints, arolia black and apical half of claws brown. Ferruginous are rest of mandible except dark brown upper margin and apex, mouth parts, tegula (transparent) and basal plates of wing (brown at the centre), apex of propodeum, apex and sides

of gastral segment 1, not well outlined band across middle of tergite 2, similar but narrow one on tergite 3, sternites 2-6, rest of fore trochanter and femur, rest of mid femur, hind tibia on inside and at apex and apical spurs. Hind tarsus dirty brown, base of each joint paler; clypeus with apical margin with its teeth dark brown, behind which the disc narrowly ferruginous. Hairs on clypeus silvery, pubescence on upper side of head and thorax short and sparse, on temple and mesopleuron slightly close, on propodeum somewhat long.

The form and structure of head seen from above and in front (Fig. 88) similar to those of *rufiventris* (Tsuneki, 1968, Pl. II, Figs. 1 and 2), except clypeus, but the elevation at the anterior verge of upper frons on both sides of frontal furrow much less conspicuous. Inner orbital fovea weakly impressed, in form as in *rufiventris*, ocellar location also similar. Clypeus (Fig. 89) very short, medianly tridentate, disc without medial elevation. Antenna slightly thicker apically and slightly shorter than in *rufiventris*, joint 3 twice as long as wide at apex, joints 5 and 6 as long as wide, 7-11 slightly shorter than wide. Mandible structured as in *rufiventris*, in fresh specimens apical teeth acutely pointed at apex (Fig. 90). Occipital carina ending far before reaching buccal carina, not toothed at the ends. Collar on posterior third discoloured as in the compared species, medial incision from behind narrow, not completely cut through the yellow banded elevated area; scuto-scutellar furrow broad and deep, finely crenate. Mesopleuron without precoxal carina or tooth. On propodeum area dorsalis not enclosed, at base narrowly impressed and coarsely irregularly striated, the impression slightly broadened towards middle, from apex of which a narrow groove running down, the groove turned into a spindle-shaped impression on posterior aspect and connected with medio-apical ridge, on both sides of the ridge the surface impressed into a large fovea; lateral propodeal carina very shortly defined at apex; stigmata well developed, accompanied by a short oblique stigmatal furrow, about thrice as long as stigmata and tapered at apex. Gastral tergite 1 in vertical view appr. 1.3 times as long as wide at apex, relatively shorter than in *rufiventris*; pygidial area as in this (Figs. 90, 91, the latter a variation). Fore femur thick, longitudinally excavated in front to receive the folded tibia and broadly flattened beneath with the surface smooth and polished, fore metatarsus as long as the rest of tarsal joints united, on outer margin distinctly fringed with about 8 spines, the spines not uniform in length, the longer one about as long as the width of the segment, but mostly shorter than this; mid tibia with a sparse row of short spines on apical half of outer side, hind tibia strongly irregularly spinose on outer side the spines less in number (7-8), but with the bases shortly tuberculate, the longer spur about $3/4$ the length of the following metatarsus.

Vertex and upper frons smooth and shining, with very minute hair points very sparsely scattered (practically impunctate, in *rufiventris* weakly microcoriaceous, not shining). Mesoscutum finely fairly closely punctured, punctures posteriorly finer and much sparser, without longitudinal striae on apical margin; mesopleuron punctured as on vertex, but less shining due to close hairs, metapleuron longitudinally finely closely striate. Propodeum smooth and polished, with medial furrow not crenate, on the part corresponding area dorsalis the hair very sparse, with a few fine punctures scattered, punctures laterally and posteriorly finer and closer and on posterior third a few weak rugose striae present; sides longitudinally finely very closely striate. 1st tergite finely fairly closely punctate, remaining tergites practically impunctate, smooth and polished, pygidial area nearly microcoriaceous, sparsely, not strongly punctured.

♂. Length 4.8 mm. Similar to ♀, differences in colour: Clypeus except anterior margin wholly yellow, mandible also yellow, with apex and dorsal margin brown; gaster more broadly ferruginous red (apical portion of segment

1, tergites 2 and 3 except dark brown base and apical mark and sternites 2-4; sternite 2 carrying an elongate mark on each side). Fore and mid legs wholly yellow except extreme base, arolia and indistinct ferruginous marks at base of femora. (Hind leg as in ♀).

Ocellar location as in ♀, inner orbital fovea indistinct, only defined by its glabrous and shining black (not aeneous) surface, structure of upper frons as in ♀, head seen in front in form similar to ♀, clypeus: Fig. 93, mandible: Fig. 94, uppermost tooth very small, vestigial. Antennal joint 1 ecarinate, flagellum very slightly thicker apically, joint 3 1.8 times as long as wide at apex, 5 slightly longer than wide, 6 as long as wide, thence wider than long till penultimate joint, ultimate joint as long as joint 3. Structure of thorax and propodeum as in ♀; gastral tergite 1 about 1.4 times as long as wide; legs also similar to ♀, but generally somewhat less robust and tarsal spines almost lacking. Punctuation also similar, but end tergite more coarsely punctured than on the preceding tergite.

Holotype: ♀, Wushe - Pihu, Nantou Pref., 21-23. VIII. 1976, T. Murota leg (Coll. Tsumeki)

Paratypes: 3 ♀♀ 1 ♂, the same data (Coll. Murota).

Remarks. The discovery of the second species (♀♂) makes the characters of the subgenus more distinct. It is characterized by the parallel-sided, internally excavated and apically subuniformly tridentate mandible (in the male upper tooth vestigial), ecarinate antennal scape, somewhat low triangularly disposed ocelli, anteriorly half notched and posteriorly lamellate and discoloured pronotal collar, edentate or ecarinate mesopleuron, slightly longer first gastral segment and broad triangular and flattened pygidial area in female and more coarsely punctured caudal tergite in male.

Judging by the flattened triangular pygidial area and the tarsal comb of the fore leg the members of the subgenus to which the present species belongs are presumed to have the terricolous habits.

Rhopalum (Rhopalum) mashaense Tsumeki, 1971

Rhopalum (Rhopalum) mashaense Tsumeki, Etizenia, 51: 27, 1971 (♀).

Specimens examined: 2♀ 5♂, Wushe - Pihu, Nantou Pref., 21-23. VIII., T. Murota leg.

Description of ♂ (hitherto unknown). Length 3.5-5.0 mm. Similar to ♀. Clypeus: Fig. 95, the protuberance of the teeth slightly weaker than in ♀. Antenna: Fig. 96, joints 5 and 6 sometimes (2/5) ferruginous, sometimes black. As to legs mid tibia yellow and in middle part broadly black, otherwise as in ♀ in colour; fore metatarsus not dilated, without any protuberance, only gently curved (Fig. 97). Medial furrow of area dorsalis on propodeum very fine and weak, only hair-like and can not be observed under low power.

Lestica (Solenius) collaris maculata ssp. nov.

Differs from the typical race in that the body is much larger (10 mm), the first gastral tergite with a transverse orange mark before apex and a minute orange spot on each side, the mark on each side of tergites 3 and 4 larger (in the typical specimen usually none, when present not large) and hind tibial spurs wider, with apex rounded.

Holotype: ♀, Pempuchi, Nantou Pref., 29. VII. 1976, T. Tano leg. (Coll. Tano).

Oxybelus lewisi Cameron, 1890

Oxybelus lewisi: Tsuneki, Etizenia, 30: 27, 1968 (♂, Yingko and Liyuchi).

Specimens examined: 1 ♀ 1 ♂, Taitung, 11. VIII., T. Murota leg.

Remarks. The specimens (4 ♂♂) captured by me previously except one from Liyuchih have the gastral maculae on tergite 1-3 only, but the present specimens all bear larger ones on tergites 1-5, and those on 5 are fused into a band.

Oxybelus agilis Smith, 1856

Oxybelus agile: Pate, Phil. J. Sci., 64: 387, 1938 (with references).

Oxybelus agilis: Sonan, Trans. Nat. Hist. Soc. Formosa, 30: 20, 1940

Specimens examined: 2 ♀ 2 ♂, Sea shore of Taitung, Taitung Pref., 11. VIII., T. Murota leg.

The characters of this species have been described by the original author (1856: ♂ agilis, ♀ sabulosus), Bingham (1897, do.), Turner (1917) and Sonan (1940, in Japanese), but of course none has touched on the characters recently employed to separate the species except for the micro. On this account it is uncertain whether the specimens hitherto recorded under agilis belong to the same species or not. The specimens before me are considered certainly to be the same species as those dealt with by Sonan. But I can not identify them with confidence with agilis Smith, although, as far as the descriptions go, they agree considerably well with the original descriptions (♀♂) of this species. The name adopted here is, therefore, rather provisional. The important characters of the specimens will be given for the future comparison with the type specimens of this species:

Colouration is as given in detail by J. Sonan. ♀♂: Mandible black, with medial area broadly ferruginous brown, the marks on scutellum variable in size, sometimes lacking; fore and mid femora black, yellow beneath except basal third, fore tibia externally yellow, anteriorly ferruginous, internally black; tarsi ferruginous, mid and hind tarsi basally deep brown. ♀: mid and hind tibiae black, only on basal third of outer side yellow; ♂: mid tibia yellow, only on inner side black, hind tibia black, with a yellow ring on basal third.

Clypeus: Fig. 98 (♀), Figs. 99 and 100 (♂), squamae and micro: Fig. 101 (♀), micro slightly narrower in ♂; squama bifid at apex: Figs. 102 (right one from outside) and 103 (left one from inside). In ♂ gastral tergites 3-6, each has a short tooth on each postero-lateral corner, the teeth posteriorly slightly longer.

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LIST OF SPECIES OF SPHECIDAE IN BOTEL TOBAGO ISLAND

Yasumatsu recorded the following species:
Sphex sulciscutus Gribodo (= madasummae Van der Vecht).
Sphex aurulentus Fabricius (= sericeus lineolus Lepeletier).
Sceliphron madraspatanum (Fabricius)
Sceliphron bengalense (Dahlbom) (= Chalybion).
Larra rufipes (Smith) (= L. polita (Smith)).
Larra nana Bingham (?).
Motes subtessellata (Smith) (= Liris).
Tachysphex bengalensis Cameron (?).
Trypoxylon formosicola Strand.
Trypoxylon gracilescens petioloides Strand.

The following is collected by Mr. B. S. Chang, Kuangyin, Taoyuan Pref., Taiwan, during March 31 - April 1, 1973, and sent to me for study:

Chalybion bengalense (Dahlbom), 5♀ 7♂.
Cerceris pictiventris formosicola Strand, 1♂.
Bembecinus hungaricus formosanus Tsuneki, 5♀.
Liris (Liris) aurulenta (Fabricius), 3♀.
Liris (Leptolarra) docilis (Smith), 2♀ 1♂.
Tachysphex nigricolor (Dalla Torre), 2♀ 1♂.

(K. Tsuneki)

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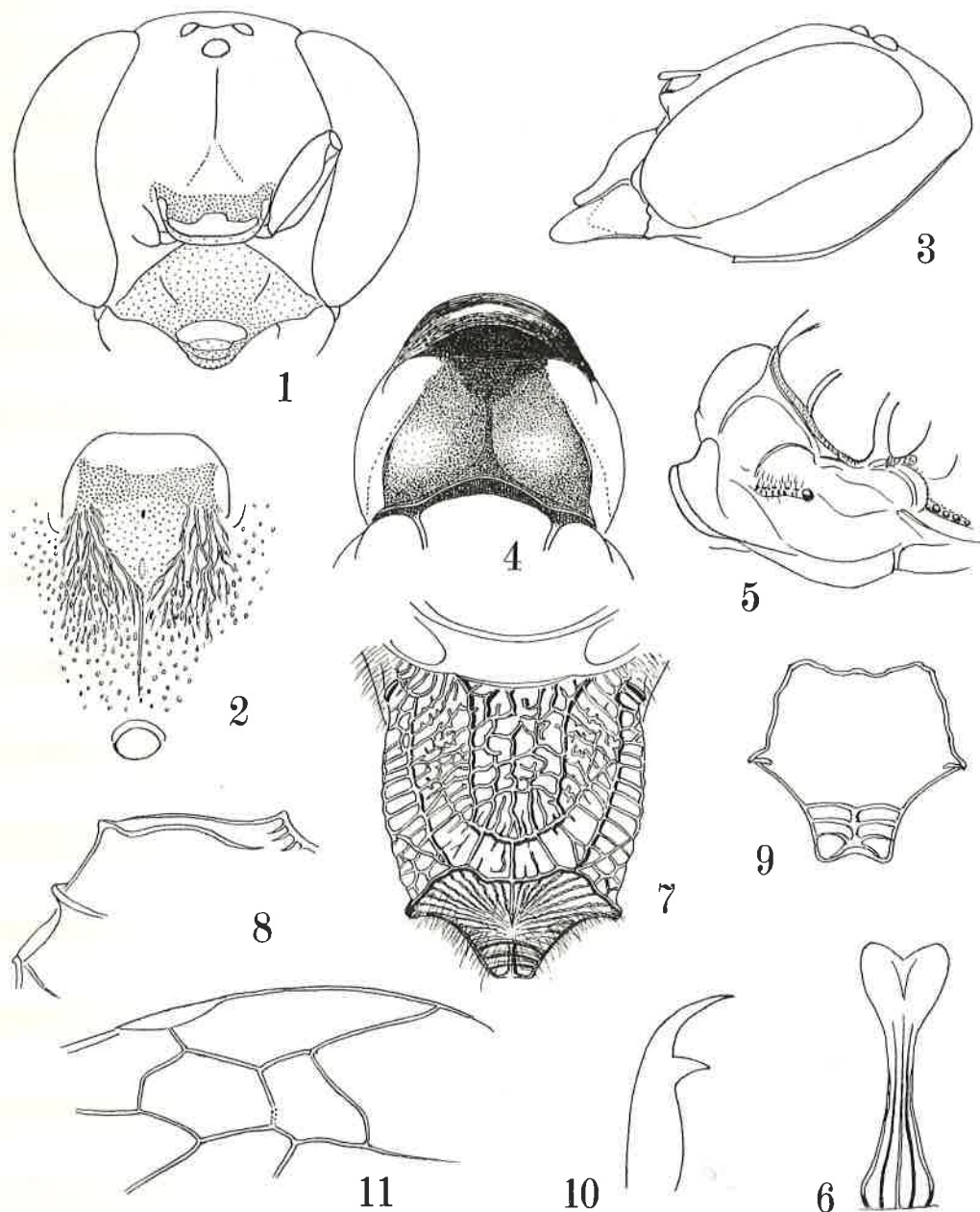
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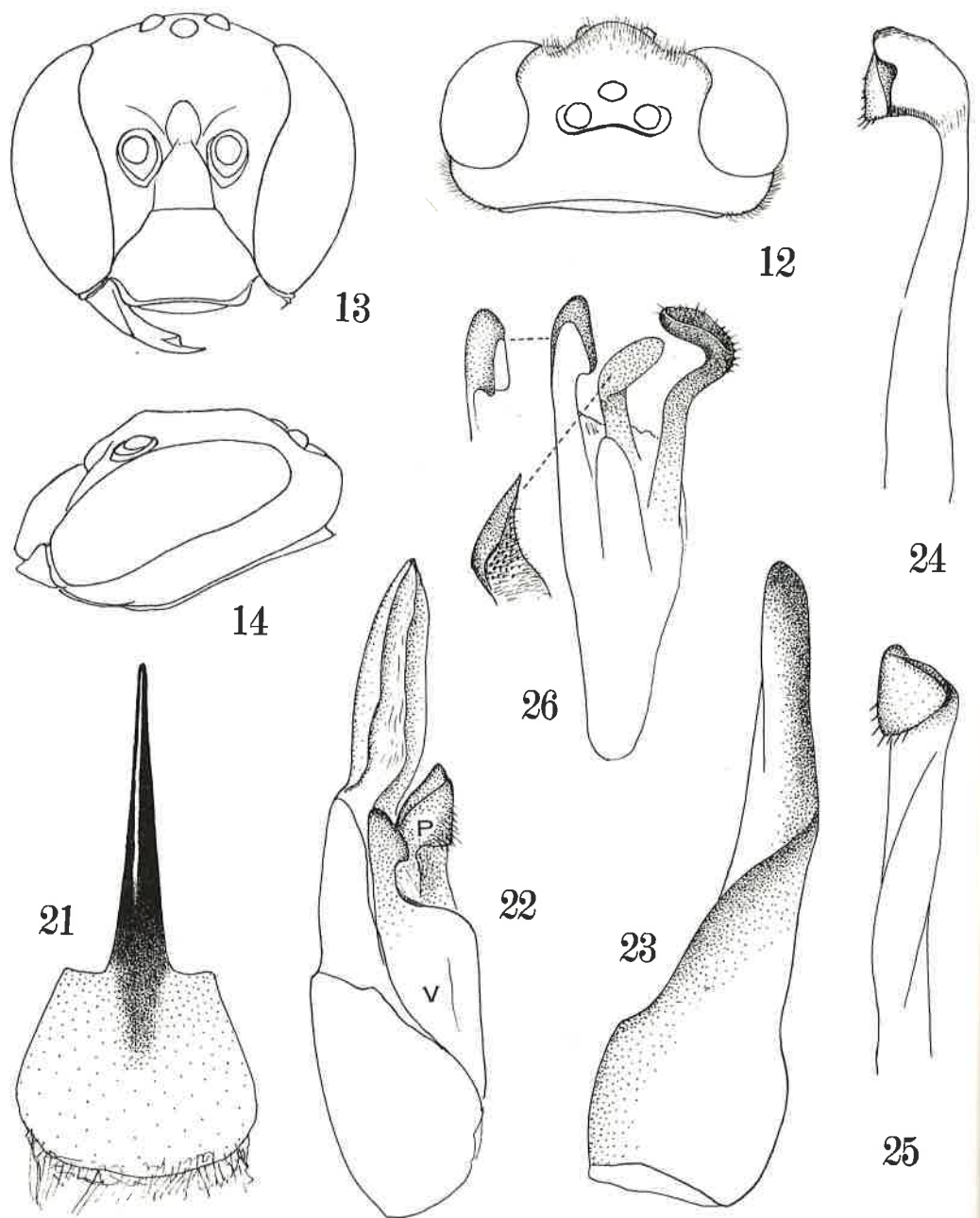
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Figs. 1-11. *Dolichurus apiciornatus* sp. nov., ♀.

1, 3: Head. 2: Frontal sculpture and lamina. 4: Pronotum (dorsal). 5: Ditto (dorso-lateral). 6: Metasternum (frontal). 7: Propodeum. 8: Ditto (lateral). 9: Platform on posterior aspect of propodeum. 10: Claw. 11: Fore wing venation.



Figs. 12-26. *Gorytes fuliginosus* Tsuneki, ♂

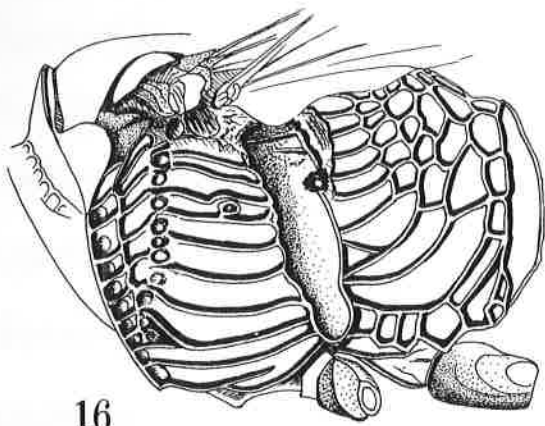
12, 13, 14: Head. 21: Sternite 8. 22: Right half of genitalia (from inside, V: volsella, P: penis valve). 23: Paramere (from outside). 24: Penis valve (from outside). 25: Ditto (ventral). 26: Volsella.



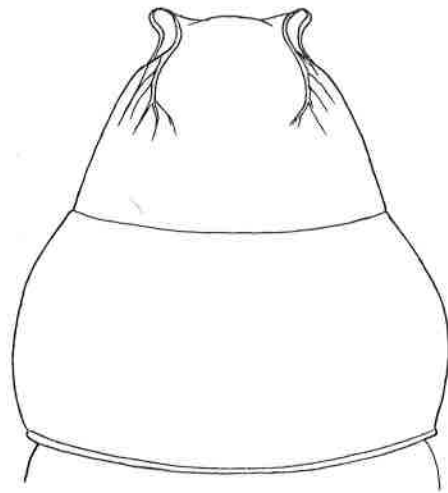
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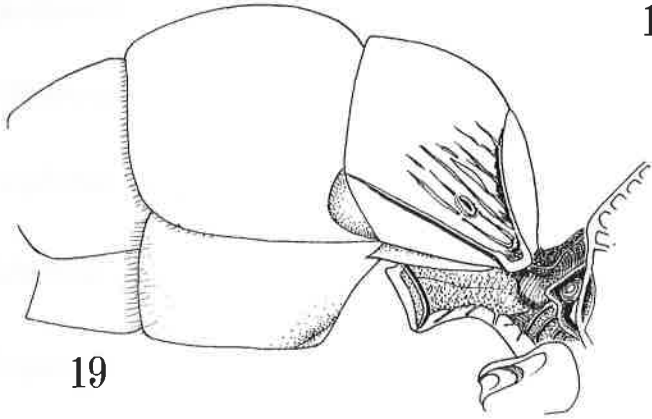
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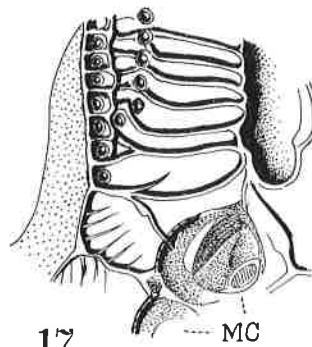
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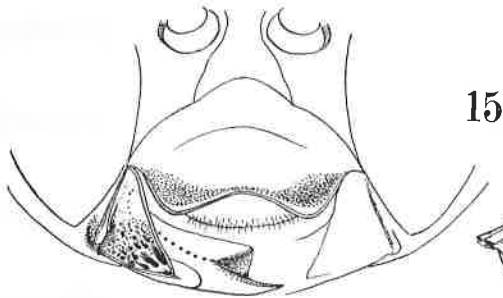
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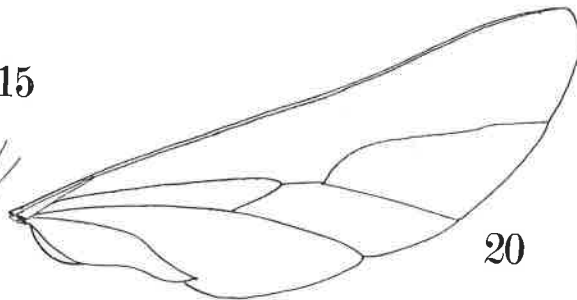
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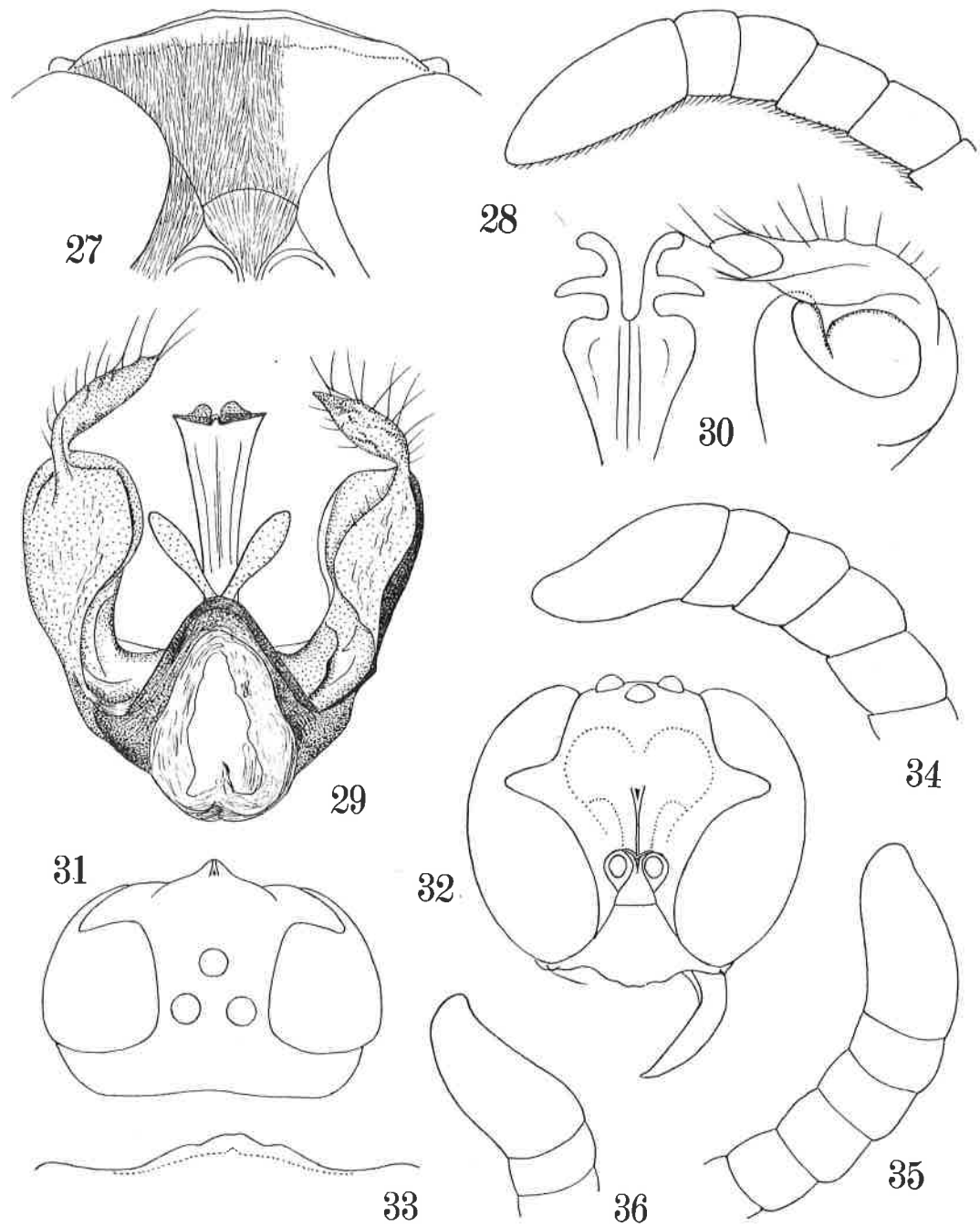


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Figs. 12-26. *Gorytes fuliginosus* Tsuneki, ♂

15: Clypeus and mandible (ventral). 16: Sculpture of meso-, metapleuron and propodeum. 17: Mesopleuron and mesosternum (obliquely from beneath, MC: mid coxa). 18: Gastral tergites 1 and 2. 19: Ditto (lateral). 20: Hind wing venation.

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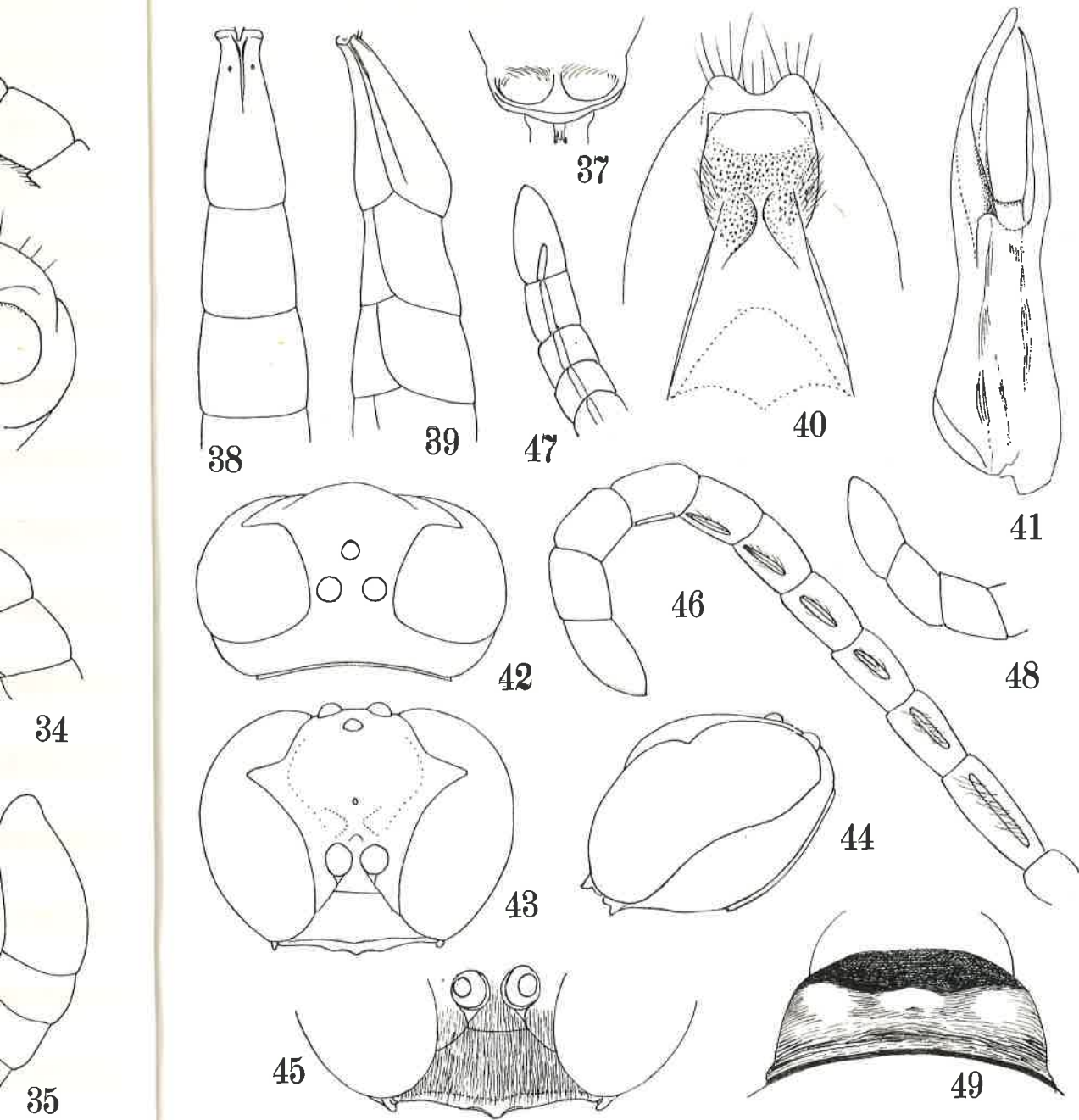


Figs. 27-30. *Trypoxylon melanocorne* Strand, ♂

27: Clypeus. 28: Apical joints of antenna. 29: Genitalia (ventral). 30: Penis valve and paramere (from apex).

Figs. 31-41. *Trypoxylon venustum* sp. nov., ♂

31, 32: Head. 33: Clypeus. 34; 35, 36: Apical joints of antenna (different view).

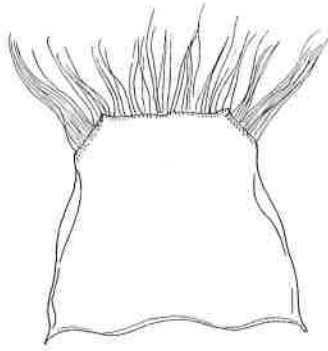


Figs. 31-41. *Trypoxylon venustum* sp. nov., ♂

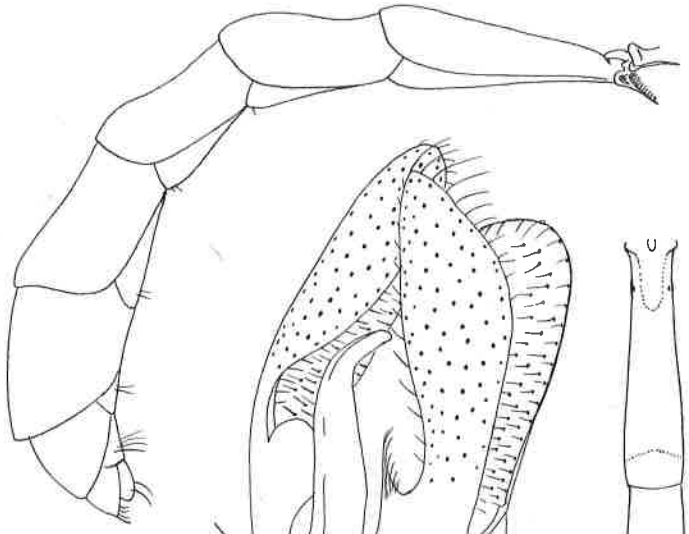
37: Petiole socket (dorsal). 38: Gastral segments 1-3 (dorsal). 39: Ditto (lateral).
40: Sternites 7 and 8 (dorsal, inner one: 7). 41: Paramere of genitalia.

Figs. 42-55. *Trypoxylon planifrons* sp. nov., ♂

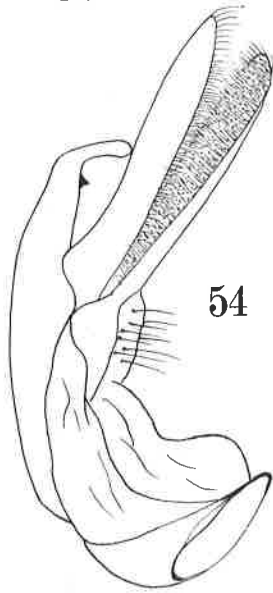
42, 43, 44: Head. 45: Clypeus. 46: Antenna (ventral). 47: Apical joints (ventral).
48: Ditto (lateral). 49: Pronotum.



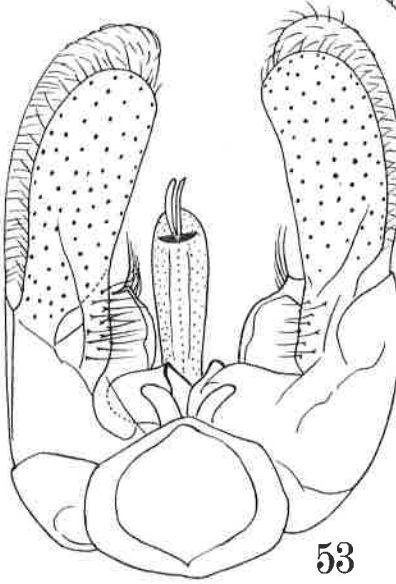
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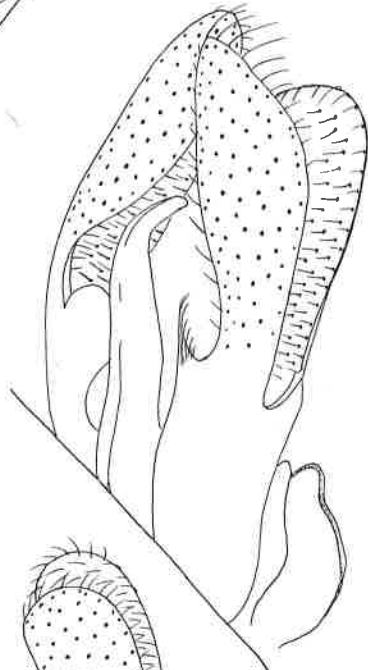
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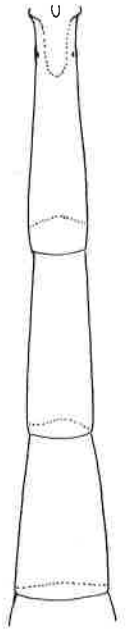
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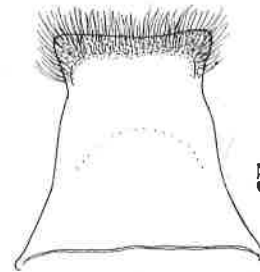
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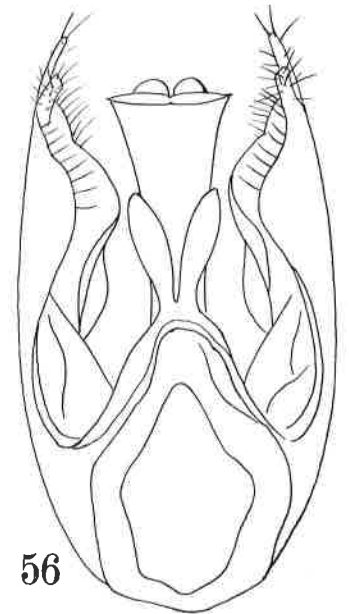
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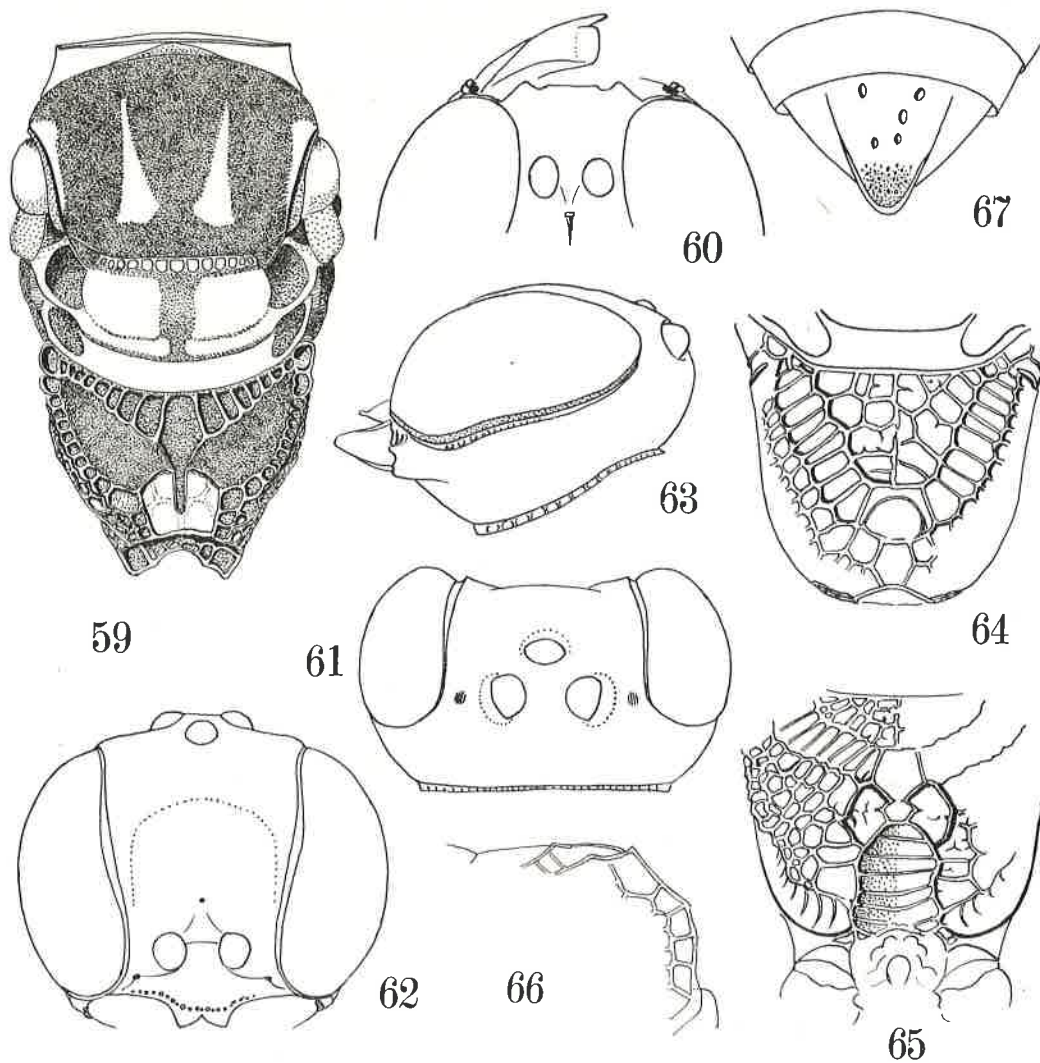
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Figs. 42-55. *Trypoxylon planifrons* sp. nov., ♂

50: Gastral tergites 1-3. 51: Gaster (lateral). 52: Sternite 8. 53: Genitalia (ventral).
54: Ditto (left half, lateral). 55: Ditto (dorso-lateral).

Figs. 56-58. *Trypoxylon takasago* Tsuneki, ♂

56: Genitalia (ventral). 57: Ditto (lateral). 58: Sternite 8.

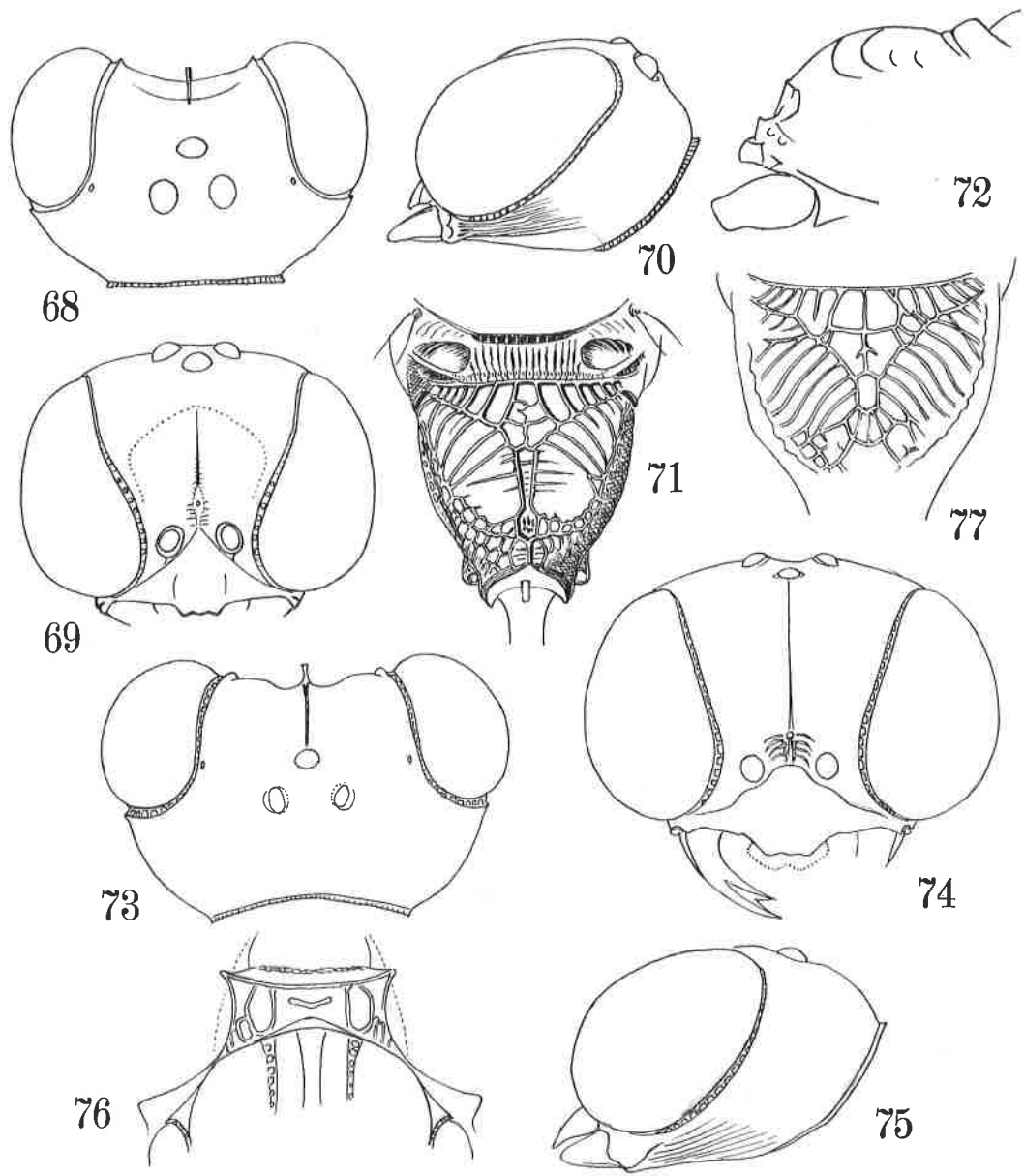
Fig. 59. *Psenulus ornatus pempuchiensis* Tsuneki, var., ♀

Maculation on thorax and propodeum.

Fig. 60. *Polemistus formosus* (Tsuneki), ♂, clypeus.

Figs. 61-67. *Stigmus marotai* sp. nov., ♀

61, 62, 63: Head. 64: Propodeum (dorsal). 65: Ditto (posterior). 66: Ditto (lateral).
67: Pygidial area.

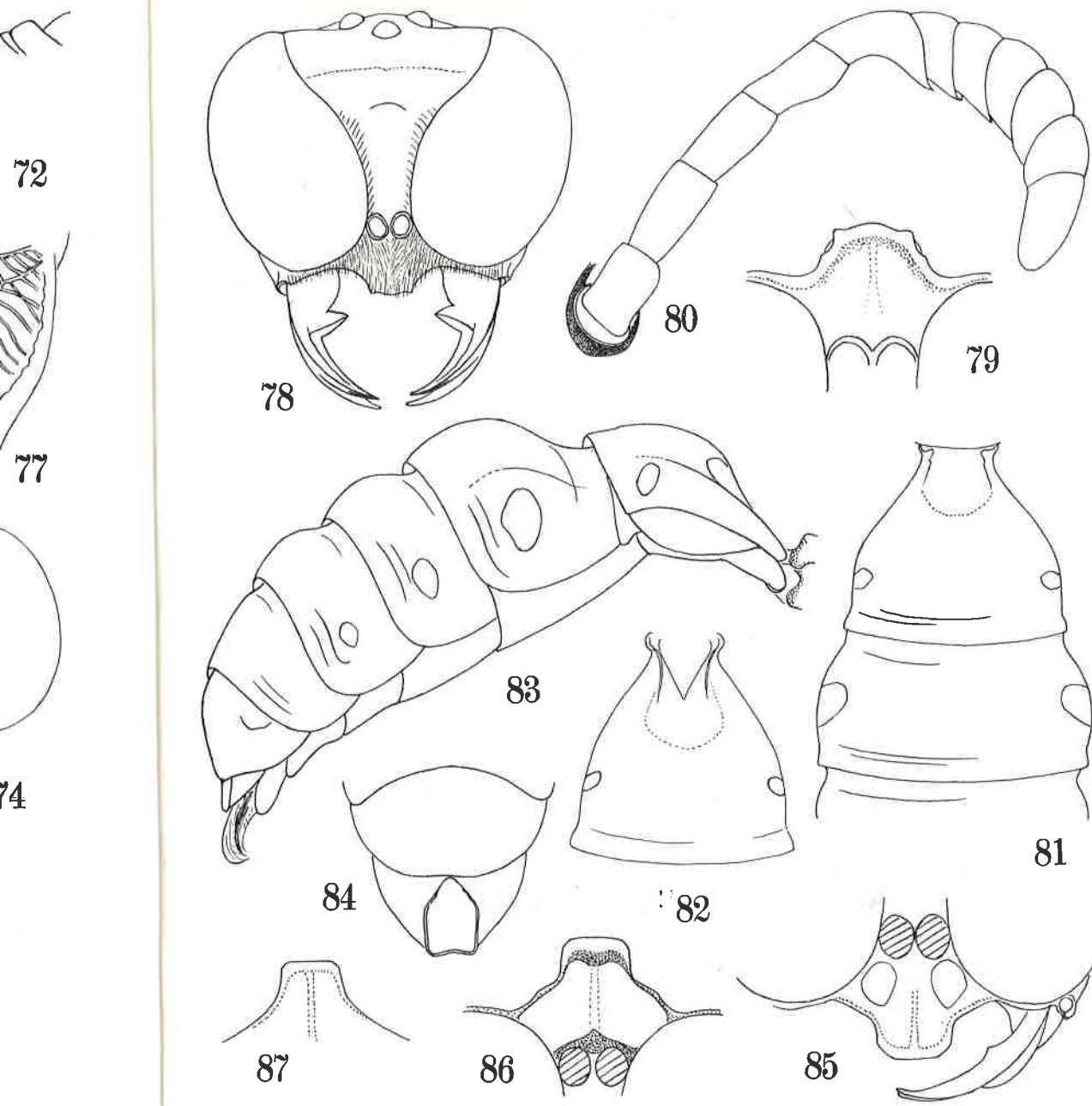


Figs. 68-72. Carinostigmus nozakai sp. nov., ♂

68: Head from above. 69: Ditto in front. 70: Ditto in profile. 71: Propodeum. 72: Ditto (lateral).

Figs. 73-77. Carinostigmus tanoi sp. nov., ♂

73: Head from above. 74: Ditto in front. 75: Ditto in profile. 76: Pronotum. 77: Propodeum, showing sculpture.

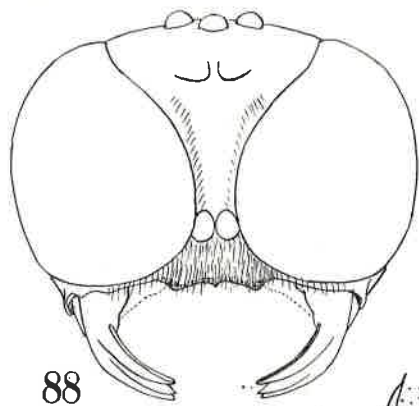


Figs. 78-84. *Ectemnius (Cameronitus) laevidorsis* sp. nov., ♂

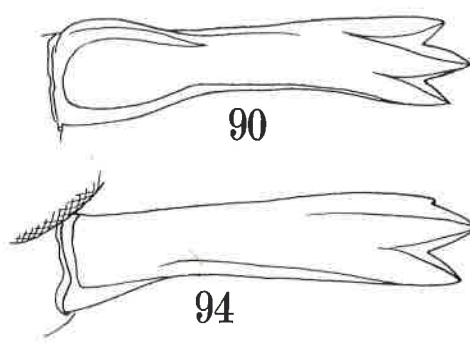
78: Head. 79: Clypeus. 80: Antenna. 81: Gastral tergites 1 and 2. 82: Tergite 1 (vertical). 83: Gaster. 84: Pygidial area.

Figs. 85-87. *Crossocerus (Cuphopterus) flavopictus* (Smith), ♂

85: Clypeus and mandible. 86, 87: Variation in medial protuberance of clypeus.

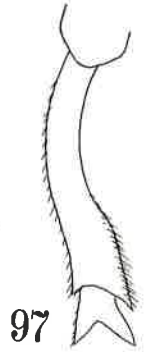


88

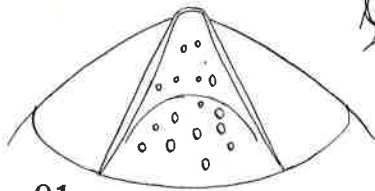


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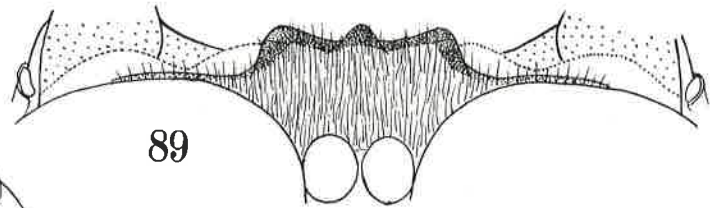
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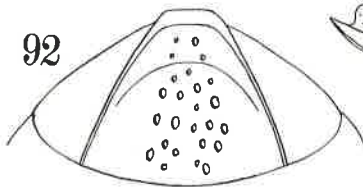
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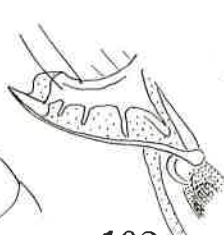
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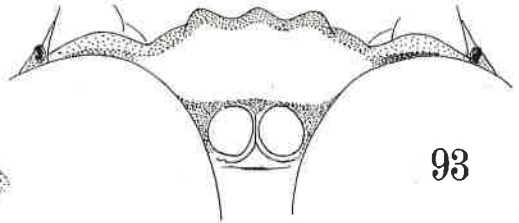
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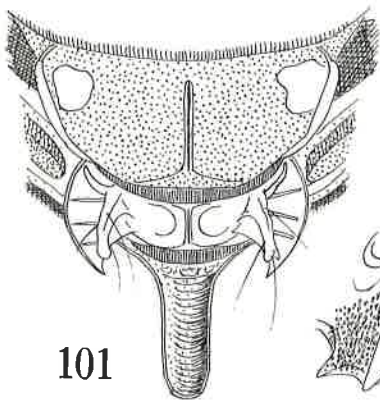
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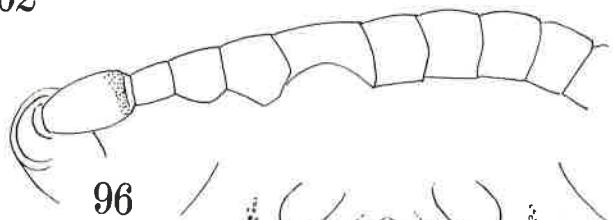
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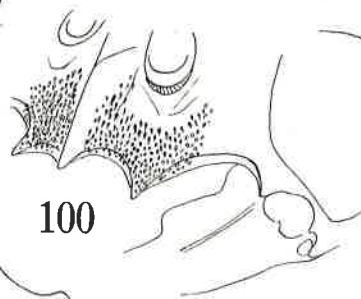
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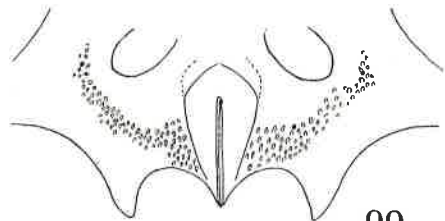
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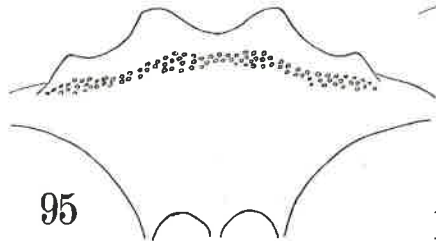
96



100



99



95



103



98

EXPLANATION OF FIGS. 88-103

Figs. 88-94. Crossocerus (Alicrabro) breviclypeatus sp. nov.
88-92 ♀, 93-94 ♂

88: Head. 89,93: Clypeus. 90,94: Right mandible (from outside). 91,92: Pygidial area (variation).

Figs. 95-97. Rhopalum (Rhopalum) mashaense Tsuneki, ♂

95: Clypeus. 96: Antenna. 97: Fore metatarsus.

Figs. 98-103. Oxybelus agilis Smith. 98,101-103 ♀, 99-100 ♂

98,100: Clypeus (obliquely dorso-lateral). 99: Ditto (frontal). 101: Scutellum and postscutellum with mucro and squama. 102: Right squama (from outside). 103: Left squama (from inside).

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