SPECIAL PUBLICATIONS
OF THE
JAPAN
HYMENOPTERISTS ASSOCIATION

NO. 24

FURTHER STUDIES ON THE LARRINAE OF THE PHILIPPINE ISLANDS, WITH REMARKS ON THE INDIAN SPECIES OF THE GENUS LYRODA, (HYMENOPTERA, SPHECIDAE)

By K. TSUNEKI

MISHIMA

JANUARY 20, 1983

FURTHER STUDIES ON THE LARRINAE OF THE PHILIPPINE ISLANDS, WITH REMARKS ON THE INDIAN SPECIES OF THE GENUS *LYRODA* (HYMENOPTERA, SPHECIDAE)

By K. TSUNEKI

C O N T E N T S

FURTHER STUDIES ON THE LARRINAE OF THE PHILIPPINE ISLANDS, WITH REMARKS ON THE INDIAN SPECIES OF THE GENUS LYRODA (HYMENOPTERA, SPHECIDAE)

By K. TSUNEKI

S Y N O P S I S

New material of the Larrinae of the Philippines, excluding the genus Trypoxylon, was investigated. In all 53 species were treated, of which 12 species and 2 subspecies were new to science: New species: Larra aponis, Liris baguionis, Liris makiling, Liris cavicola, Liris naguilianus, Liris davaonis, Tachysphex lagunaensis, Lyroda williamsi, Lyroda laguna, Pison murotai, Pison baguione and Pison nozakae. New subspecies: Dicranorhina ritsemae mindanaonis and Tachysphex changi luzonicus. Species new to the Philippines: Tachysphex changi Tsuneki, Pison kohlii Bingham, Pison ignavum Turner and Pison hospes Smith. New status: Tachytes banoensis Rohwer → Tachytes modestus banoensis Rohwer, Tachytes banoensis palawanensis Tsuneki → Tachytes modestus palawanensis Tsuneki, (Tachytes borneanus Cameron → Tachytes modestus borneanus Cameron), Liris silvicola Williams ♂ → Liris makiling sp. nov. Synonym: Liris mindanao Menke → Liris silvicola Williams, Liris robustoides Williams ♂ → ~~Liris hanedai Tsuneki ♂~~ and its paratypes ♂ ♂ are presumed to include some forms of Liris docilis Smith and Liris subtessellatus Smith ♂ ♂. Both of the latter 2 species include 2 colour forms of hind femur, black and red (variable in extent), in ♂ separation is comparatively easy, but in ♀ very difficult. Key is given to the species of Liris (Leptolarra), Tachysphex and Pison occurring in the Philippines.

Syntypes of Lyroda venusta Bingham were examined. They included 2 different species (♂ ♂, nec ♀ ♂), one of which was designated as lectotype and as the other was undescribed species it was given a new name: Lyroda binghami sp. nov. and Lyroda venusta: Williams was different from both of them and from any others known and to it new name is given: Lyroda williamsi sp. nov. Further, it was made clear that Lyroda taiwana Tsu eki was a subspecies of newly designated Lyroda venusta Bingham.

P R E F A C E

The Philippine representatives of the Larrine wasps were excellently investigated by the late Dr. F. X. Williams as early as 1928 and many species were described in detail with rich illustrations including the male genital organs and the 8th sternite of the gaster of each species. In 1976 a considerable number of the Larrine species and subspecies were added to the Philippine fauna when the result of the Noona Dan Expedition to the Southern Philippines that was undertaken by the Zoological Museum of University of Copenhagen was investigated by me. Further, as to the species of the genus Trypoxylon a special study was made by me with the rich material derived from the collections of the United States National Museum of Natural History, Washington, D. C, British Museum (Natural History), London, Bernice P. Bishop Museum, Honolulu, Californis Academy of Sciences, San Francisco and American Entomological Institute, Ann Arbor and very many species and subspecies have been brought to light.

Recently the members of the Japan Hymenopterists Association living in Fukui Prefecture, Miss C. Nozaka, Messrs T. Tano, H. Kurokawa, T. Murota and K. Sabi, either singly or forming various parties visited several times repeatedly the Luzon, Mindanao, Cebu, Negros and the Leyte to observe and to collect the Hymenopterous insects. As they are all the long experienced hymenopterists they could collect very rich specimens of wasps and bees including many curious species. The present investigation was done on the basis of the specimens they collected which were very nicely prepared for study, with the mandibles widely opened and with the genital organs and the 8th sternites extracted from the male specimens. I have a great regard to them for their courage against the dangerous and toilful activities in the guerillas active unknown localities and to thank them for their generosity to place at my disposal the valuable result of their repeated expeditions.

During the course of the present investigation I was much indebted to Dr. K. V. Krombein, Smithsonian Institution, Washington, D. C., to Dr. C. R. Vardy, British Museum (Natural History), London and to Dr. G. M. Nishida, Bernice P. Bishop Museum, Hono-

lulu, for the loan of the type specimens of the Ashmead's, Smith's, Bingham's and Cameron's species. I was received also many kind help from Dr. A. S. Menke, United States Department of Agriculture, Washington, D. C, and from Dr. K. V. Krombein in regard to some literature that were unable to access in Japan. To these gentlemen I wish to express my hearty thanks for their kindness rendered to support my study.

ABBREVIATION

In order to simplify and to formulate the measured values and comparison in the main the following abbreviations are employed, but some of them are also used in the text:

A1, A2 ... Antennomere (= antennal joint) 1, 2 ...
ACD ... Antenno-clypeal distance (distance between socket of antenna and upper margin of clypeus, in Larrinae as a rule 0).
AOD ... Antenno-ocular distance (distance beteeen socket of antenna and the nearest eye margin), (measured at the top of rim carina of socket).
AW ... Apical width.
CLL ... (Width of) clypeal lateral lobe (unless otherwise mentioned the distance between lateral angle of apical margin of median lobe (median produced part) of clypeus and the nearest inner orbit).
CML ... (Width of) clypeal median lobe (distance between lateral angles of apical margin of median produced part of clypeus).
G1, G2 ... Gastral degment 1, gastral segment 2, and so on.
GS1,GS2 ... Gastral sternite 1, gastral sternite 2, and so on.
GT1,GT2 ... Gastral tergite 1, gastral tergite 2, and so on.
HL ... Head length (dorsal or frontal view, both in middle).
HW ... Head width (maximum, in vertical or frontal view).
IAD ... Interantennal distance (distance between inner margins of antennal sockets)
IODc ... Interocular distance at base of clypeus.
IODi ... Interocular distance at bottoms of eye incisions.
IODv ... Interocular distance at vertex
OCD ... Ocello-occipital distance (distance between posterior margin of hind ocellus and occipital margin seen vertically from above).
Od ... Ocellar diameter.
OOD ... Ocello-ocular distance (distance between outer margin of hind ocellus and nearest inner orbit).
PD ... Puncture diameter.
PIS ... Puncture-interspaces.
POD ... Postocellar distance (distance between inner margins of hind ocelli, measured as a rule at the foot of the elevation of ocellus, when measured at the margin of pupil, particularly mentioned).
T1, T2 ... Tarsomere (= tarsal joint) 1 (=basi- or meta-tarsus), tarsomere 2, and so on.
WAS ... Width of antennal socket.
FOd ... Fore ocellar diameter.

Remarks. Measurements are always made with relative length. When HW is included all others are measured under the scale of HW=100, when IODv is at the top all others are measured under the scale of IODv=10, while antennomeres are always measured under the scale of A3=10.

Measurement of IODv, OOD and POD is frequently difficult, because exact margin of eye and ocellus is not always distinct and the difference of 1/100 or 2/100 is within the probable error.

Venation of wing is not always exactly constant; therefore, the comparison of the relative length of abscissae of radial vein of fore wing should be done statistically. They are considerably variable within the same species and sometimes even between the right and left wings of the same individual. Similarly the number of the spines included in the longitudinal carina at the outer margin of hind tibia is inconstant.

DESCRIPTIONS AND RECORDS OF THE SPECIES

I. TRIBE LARRINI

1. LARRA (CRATOLARRA) POLITA (SMITH, 1857)

Larrada polita Smith, J. Proc. Linn. Soc. London, Zool., II, p. 102, 1857 (Borneo).
Larra polita: Kohl, Verh. Zool.-Bot. Ges. Wien, 34: 246, 1885 (listed).
Larra polita: Tsuneki, Etizenia, 20: 24, 1967 (24 ♀ 45 ♂, Formosa); 1971, p. 2 (9 ♀ 19 ♂, Formosa); Haneda, 1971, p. 29 (1 ♀ 7 ♂, Formosa); 1972, p. 5 (2 ♀ 2 ♂, Formosa); Murota, 1973, p. 118 (14 ♂, Formosa); 1977, p. 23 (7 ♂, Formosa); Murota et Tano, 1977, p. 32 (1 ♀ 4 ♂, Botel Tobago Is.).
Larra polita: Tsuneki, Steenstrupia (Copenhagen), 4: 57, 1976 (11 ♀ 7 ♂, Philippines: Palawan, Balabac and Mindanao).
Larra (Cratolarra) polita: Bohart & Menke, World Sphecid., p. 238 (rufipes Sm. and luzonensis Will. as sspp.).
Larra polita: Tsuneki, SPJHA, 19: 5, 1982 (5 ♀ 7 ♂, Bismarck Archip., luzonensis and and polita are distinct species).

Specimens examined: 2 ♀ 1 ♂, Mindanao: 1 ♀ 1 ♂, Davao, Matina Heights, 4.VIII. 1980, K. Sabi; 1 ♀, Zamboanga, Pasonanca Park, 30-31.VII.1980, T.Murota.

Remarks.

Comparison with the Formosan specimens: In the Philippine specimens fore legs much darker, in ♀ apical area of femur narrowly reddish, tibia almost without reddish tinge, only in one of the specim ns slightly brownish on inner side; in ♂ femur at base and apical area and tibia at base and fore side broadly reddish. In the Formosan population in ♀ apical area of fore femur more broadly and tibia much more broadly reddish - ground colour reddish ferruginous with obscurely outlined dark (not deep black) marks irregularly disposed; in ♂ femur reddish ferruginous, variegated with irregularly disposed and obscurely outlined blackish mark or marks on basal half but sometimes completely without dark mark; tibia generally as in ♀, but sometimes almost completely reddish ferruginous, that is to say, the Formosan population is rather close to rufipes Smith.

Morphologically both populations are very similar to each other. Slight differences: In the Philippines medial carina on dorsum of propodeum stronger, with surface on both sides along the carina distinctly impressed (♀ ♂), while in the Formosan the carina weaker, always without impressed lines along it. Piliferous punctures on gastral tergites in the Philippines much sparser and punctured area much less extended posteriorly on each segment, hence gaster appears much more shining.

Comparison with luzonensis Rohwer: In the external characters except colour of legs both are very similar, only gastral punctures in ♂ closer in luzonensis, but in the structure of the genital organs slight difference can be observed: The large hollow on inner side of basiparamere is in polita more distinctly outlined at apical and outer margins, especially at outer margin where the verge is acutely edged and the hollow appears somewhat deeper; ventral lobe of volsella more pointed at apex and dorsal lobe more broadly rounded than in luzonensis.

As to wing venation length relation of abscissae of radial vein more or less variable in both species as usual, but general state and trend of variation are very similar. Abscissae 1, 2, 3 are usually subequal in length, but frequently 2 becomes shorter and 3 longer, of course 4 also variable more or less.

Ecologically luzonensis and polita are sympatric and hence they can not be in a subspecific relationships.

2. LARRA (CRATOLARRA) LUZONENSIS ROHWER, 1919

Larra luzonensis Rohwer, Bull. Exp. Sta. Hawn. Sug. Plant. Ass. Ent. Ser., 14: 10, 1919 (♀, Philippines).
Larra luzonensis: Williams, Ibid., 19: 39, 68, 1928 (♀ ♂, Philippines, Borneo).
Larra luzonensis: Baltazar, Pac. Ins. Monogr., 8: 330, 1966 (Philippines, Borneo and Hawaii).
Larra luzonensis: Tsuneki, Etizenia, 17: 9, 1966 (Ryukyus).

Larra luzonensis: Tsuneki, Etizenia, 20: 22, 1967 (10 ♀ 70 ♂, formosa, redescription).
Larra luzonensis: Tsuneki, Ibid., 55: 2, 1971 (1 ♀ 1 ♂, Formosa); Haneda, 1972, p. 3, (10 ♂, Formosa); Murota, 1973, p. 118 (7 ♀, Formosa); 1977, p. 23 (5 ♀ 1 ♂, Formosa).
Larra (Cratolarra) polita luzonensis: Bohart & Menke, World Sphecid., p. 238, 1976 (new comb. after Vecht).
Larra luzonensis: Tsuneki, SPJHA, 19: 5, 1982 (not ssp.).

Specimens examined:
5 ♀ 25 ♂, Luzon: Prov. Laguna: 3 ♂, Los Banos, 2-5. VIII. 1978; 1 ♀ 2 ♂, Hidden Valley Spring, Alaminos, 6.VIII.1978; 3 ♀ 5 ♂, Pagsanjan, 7-9.VIII.1978, T. Murota. Prov. Camarinessur: 1 ♀ 1 ♂, Baao, 16.VIII.1978; Prov. Albay: 1 ♂, Tabaco, 19.VIII. 1978; Prov. Mountain: 3 ♂, Bontoc, 850 m, 29-30.XII.1979; 1 ♀ 7 ♂, near Bontoc, 1000 m, 31.XII.1979; 1 ♂, 16 km from Baguio City, Asin Spa, 600 m, 2.I.1980, T.Murota; Prov. Launion: 1 ♂, Naguilion, 4.I.1980, T.Murota.
3 ♂, Mindanao: 1 ♂, Zamboanga, Pasonanca Park, 30-31.VII.1980, H.Kurokawa; 1 ♂*, Davao, near beach, 5.VIII.1980, K.Sabi; 1 ♂*, Bukidnon, Malaybalay, 700 m, 12.VIII. 1980, T.Murota.

Remarks. Variation in colour. In ♂ fore tibia very frequently (almost always), mid tibia sometimes, both on fore side, reddish brown and, moreover, both tibiae at base and apex with a red ring. In some specimens mid femur medianly in front with a vague reddish area. In the specimens bearing strong reddish fore tibia fore tarsus also considerably brownish. In one specimen from Pagsanjan and in two from Mindanao (shown with asterisk), besides fore and mid tibiae and fore tarsus, mid femur and hind tibia also considerably broadly brown. As to mid and hind tarsi, in one of the Mindanao specimens both are strongly brownish, but in the other two both are darkened as usual. In ♀ fore tiibia sometimes brownish on inner side and hind tibia very frequently bearing a vague short reddish stripe on fore side.

Comparison with the Formosan specimens. In various characters with tendency of variation very similar to each other, only the fine piliferous punctures on gastral tergttes seem somewhat sparser in the Philippine population than in the Formosan.

L. luzonensis is not in a subspecific relationships with L. polita as mentioned in connection with the latter species.

3. LARRA (CRATOLARRA) CARBONARIA (SMITH, 1858)

Larrada carbonaria Smith, J. Proc. Linn. Soc. London, Zool., 2: 102, 1958 (♀, Singapore).
Larra carbonaria: Williams, Bull. Exp. Sta. H.S.P.A., Ent. Ser., 19: 41, 67, 1928 (Philippines: Luzon, Bohol, Samar, Mindanao, Basilan, Singapore, Tenasserim and Sumatra).
Larra carbonaria: Tsuneki, Etizenia, 20: 20, 1967 (list of ref. and syn., 13 ♀ 26 ♂, Formosa).
Larra carbonaria: Tsuneki, Steenstrupia, 4: 58, 1976 (1 ♂, Palawan).
Larra (Cratolarra) carbonaria: Bohart & Menke, World Sphecid., p. 237, 1976 (listed, distr. syn.).

Specimen examined: 1 ♂, Mindanao, Davao, Matina Height, 4.VIII.1980, K.Sabi.

Remarks. Similar in general characters to the Formosan specimens.

4. LARRA (CRATOLARRA) APONIS SP. NOV.

The present species closely resembles L. luzonensis, but is markedly different from this in the structure of the male genitalia. Externally it can be separated from luzonensis by the following distinctions:

♂. 1. Somewhat larger, 14 mm (largest ♂ of luzonensis hitherto examined 12 mm).

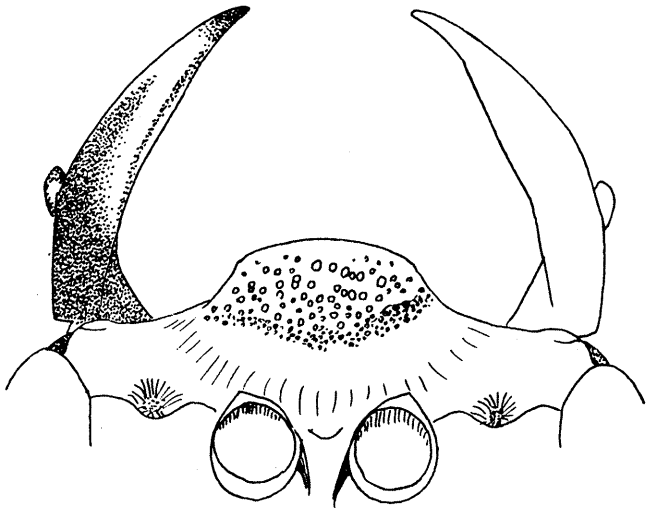
2. Clypeus: Fig. 1, median lobe markedly rounded out, with apical area not incrassate, gently, nearly flatly inclined anteriorly, surface delicately microcoriaceous and sparsely scattered with distinct punctures; in luzonensis: Fig. 2, median lobe with apical form more or less varied (Fig. 3), but always marginal area thick , and roundly inclined anteriorly, with surface smooth and polished.

3. Mandible (Fig. 1) more broadly black (white in the figure ferruginous) and completely without incision on inner margin; in luzonensis slightly thicker, more

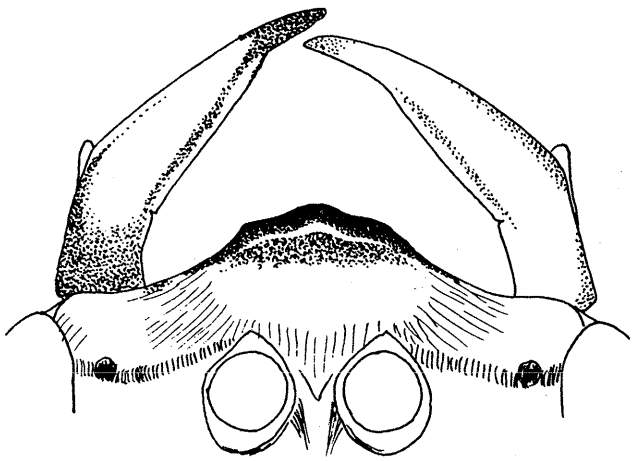
broadly ferruginous, with a minute incision on inner margin (Fig. 2).

4. Antennal placoids are on A4–11, on A12 and 13 lacking; in luzonensis on A4–13 present.

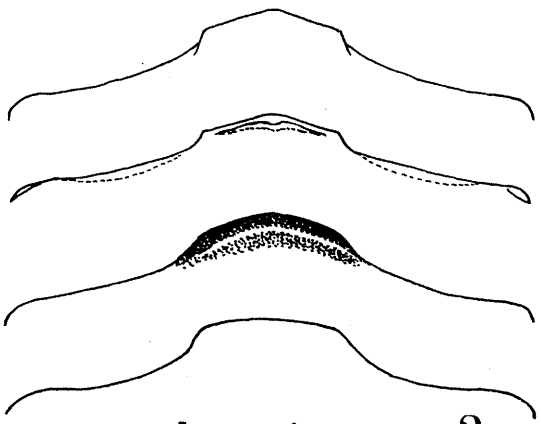
5. Postocellar impression with bottom V-shaped (sinus rounded), both arms not



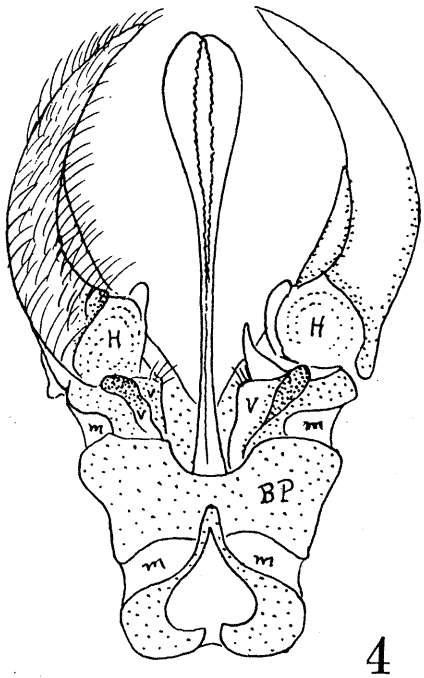
aponis ♂ 1



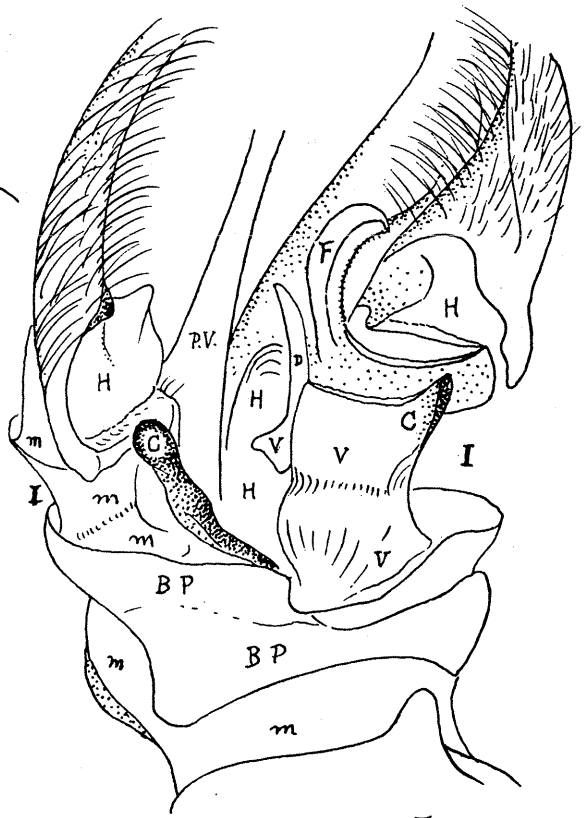
luzonensis ♂ 2



luzonensis ♂ 3



aponis ♂ 4



aponis ♂ 5

reaching inner orbits; in luzonensis angle of V much widely opened, approaching straight line, with arms extending laterally, reaching completely inner orbits.

6. Median carina of propodeal dorsum very short, about 1/6 of the length of the segment; in luzonensis, though sometimes intermittently, reaching beyond middle. Surface finely rugoso-reticulate, in some light transversely punctate-rugoso-striate, but the striae much weaker and indistinct than in luzonensis; sides simply, fairly closely punctured, in luzonensis on posterior wall of femoral sinus a series of short oblique but strong carinules present and on the rest obliquely punctate-striate, thought the striae obsolete on central area.

7. Puncture-interspaces of gaster very minutely microcoriaceous (well defined under 30× magnification) and surface not so smooth and so shining as in luzonensis.

8. Mid femur in front ferruginous red; in luzonensis mostly black, only rarely partly ferruginous.

♂. Black, basal condyle of Al, apical half of mandible, fore tibia in front on apical half with spur, mid femur in front except apical area and hind femur wholly brownish red, articulations of fore tarsus and spines of all tarsi pale brown. Hair silvery, pubescence on fore and mid femora beneath long and curved as in luzonensis. Measurements (within parenthesis luzonensis): Seen from above HW,HL,IODv,A3=100,46, 22,12 (100,44,25,13), length of propodeal dorsum relatively 54 (48). IODv:IODc=10:23 (10:21). A3,4,5=10,10,11 (10,9,9).

Genitalia in ventral view: Fig. 4, as a whole yellow in colour, but ventral process (C) black and baso-lateral excised areas and exposed intersegmental areas (m) are white. Characteristic is the very slender structure. In ventro-lateral (from left side) to observe the inner structure of basiparamere and volsella of right side: Fig. 5. P.V. penis valve, V volsella, C ventral process and D dorsal process of volsella, D (digtus?) is a sword-shaped process, F a curved finger-shaped process arising from basiparamere, H round hollow, I incised area, m white membrane of connective tissue, BP basal plate. Sternite 8 generally similar to that of luzonensis, only relatively slenderer and longer.

♀, unknown.

Holotype: ♂, Mindanao, North Cotabato, Mt. Apo (Agho), 7-9.VIII.1980, T.Murota (Coll. Tsuneki).

5. LIRIS (LIRIS) MANDIBULARIS MENKE, 1976

Liris (Liris) intermedia Williams (nec Cameron, 1903, nec Arnold, 1923), Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 83, 1928 (♂ ♀, figs. clypeus, GS8, genitalia of ♂, Luzon, Mindanao and Sibuyan).

Liris (Liris) mandibularis Menke, in Bohart & Menke, World Sphecid., p. 246, 1976 (nom. nov. for intermedia Williams).

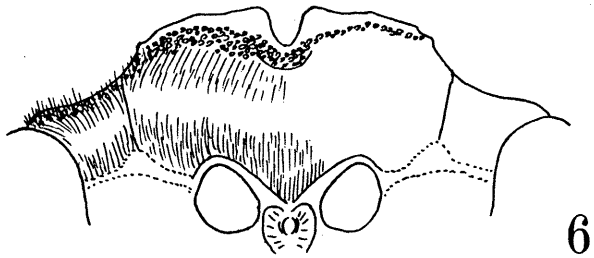
Specimens examined: 1 ♀, Luzon, Prov. Laguna, Pagsanjan, 7-9.VIII.1978, T.Murota leg., 1 ♂, Mindanao, Davao, Matina Height, 4.VIII.1980, K.Sabi leg.

Redescription:

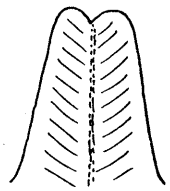
♀. 12 mm. Deep black; mandible on inner and outer margins broadly translucent brown, mouth parts brown or dark brown, tegula on posterior part translucent brown, fore and mid femora at base on posterior side narrowly reddish. Appressed hair on clypeus and face silvery, comparatively long and somewhat sparse, letting surface punctures well visible seen vertically with apical margin forwards, mixed with long sparse erect pubescence and a row of long pale brownish setae arising from somewhat gross punctures just behind apical depressed marginal area; hair on mesopleuron and underside of coxae, trochanters and femora of legs also silvery, U-shaped pile band on mesoscutum at marginal areaa and a patch on medio-anterior depression of it in some light well visible, silverily glittering, hair patches at posterior part of propodeal sides dense and well shining, vertex and rest of thorax-comprex sparsely covered with long, erect, soft and whitish pubescence, not conspicuous, pile bands on GT1-3 and appressed dense short pile of sternites silky white, with velvety shine, but on GS4 and 5 slightly brownish, pygidial area with ground dense appressed hair long, thin, soft and dark brown in colour, in some light cupresously shining, while sparse erect bristles mixed moderately long, not very thick, brown in colour, in some light appearing also cupreous. Sides of pygidium covered with dark brown hair, mixed sparsely with long, thick and brown bristles, tuft of dense short hair covering underside of fore tibia and tarsus, inner apical part of hind tibia, longer hind tibial spur beneath and hind

T1 and T5 beneath golden, appressed short hair outside longitudinal carina of hing tibia brassy. Wings moderately clouded, apical margin somewhat strongly so, almost without yellowish tinge.

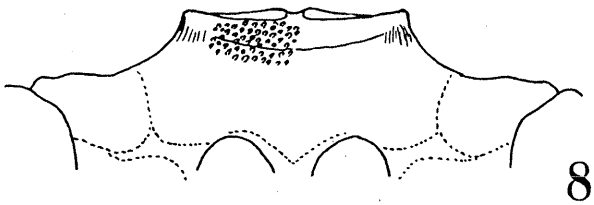
Head in dorsal view HW,HL,IODv=100,44,21. IODv,IODc,A2,A3=10,24,4.5,9. A3,4,5=10,10,10. A3=AW×3. Rhinaria on A4-11 present, on A4 small, oval in form, about 1/5 the length of segment, on others elongate oval, with both ends bluntly pointed, on 5 about half, on 6 slightly more than half, on 7 distinctly more than half the respective segment length, on 8-11 by degrees slightly smaller and narrower apically. Clypeus: Fig. 6, apical margin depressed in middle and deeply incised, bevel weak and gradual, moreover, closely covered with piliferous punctures as on disc, apical marginal area glabrous and shining, the area slightly wider medially and somewhat reflected; mandible very minutely notched on outer margin beneath before middle, but not produced at its basal angle; vertex very narrow behind eyes, almost at once steeply inclined towards occipital carina. Structure of pronotum as usual in this subgenus, with medial top fairly close to level of mesoscutum, scutellum weakly, postscutellum distinctly impressed in middle, metapleural median plate relatively narrower and longer than in docilis, with lateral margins almost straight and gently convergent apically, apical incision in about equilateral triangle, not particularly deep (Fig. 7). Propodeum on dorsum medianly shallowly depressed, without lateral carinae, but with a short medial carina at base. Pygidial area comparatively broad, slightly broader than 3:2, apical margin broadly rounded and medianly minutely and roundly incised, apical spines 3 in number, similar in colour to ground hair, partly covered by it and not conspicuous.



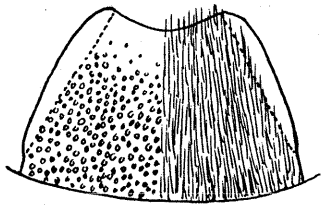
6



7



8



9

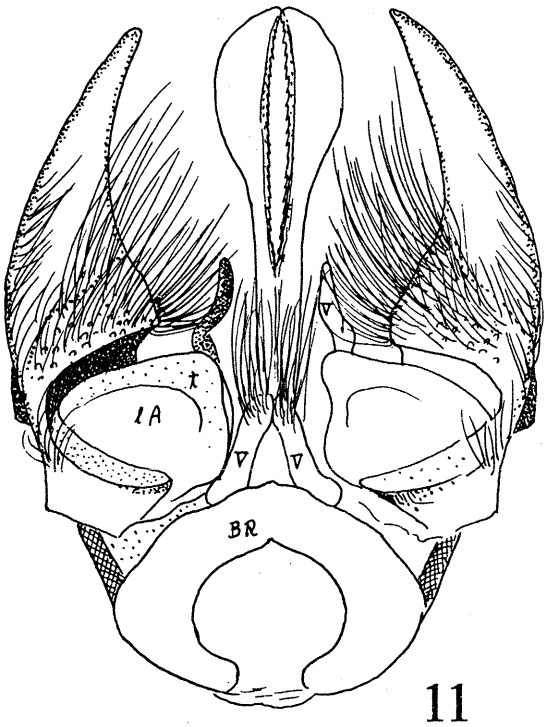
Figs. 6-9. Liris (Liris) mandibularis Menke

Mesoscutum and scutellum finely and closely punctured, with narrow PIS microcoriaceous. Epimeral area of mesopleuron without puncture, somewhat strongly regularly microreticulate, episternum below scrobal furrow more minutely and more weakly microcoriaceous and sparsely scattered with fine piliferous punctures. Propodeum on dorsum transversely, somewhat arcuately, finely, delicately and very closely striate, with interspaces minutely, weakly and irregularly punctulate, the striae well visible under frontal illumination, but almost invisible under lateral light, when somewhat coarse transverse striae at lateral areas alone observable and broad median area appears only minutely and irregularly reticulate; on posterior aspect transverse striae slightly stronger; closer upwards and sparser downwards, stronger laterally and strongest at uppermost border to dorsum where not incised in middle. Sides transversely, very finely and very closely striate, in front of spiracle and on posterior part striae almost vertical, on median-area somewhat oblique, but on this area at dorsal portion striae weak and surface appearing almost simply, very minutely coriaceous. Sides of GT6 fairly closely covered with setiferous punctures, GS6 medianly broadly smooth and laterally bearing spindle-shaped rugulose areas as usual.

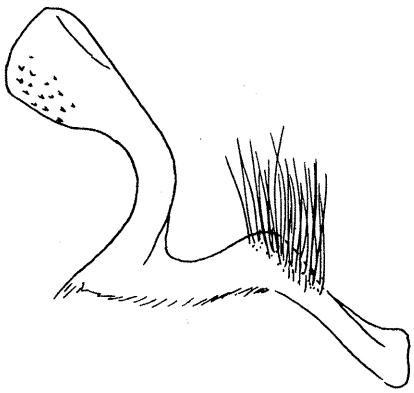
♂. 8.5 mm. Coloration similar, vestiture also similar. Measurements: HW,HL,IODv=

100,46,25. IODv,IODc,A2,A3=10,22,3,7. A3,4,5=10,10,10. A3=AW×2.5. Rhinaria (not the placoid) on A5-12 present, elongate oval, on A5 small, in length about 2/5 of the segment, on 6 slightly more than half, on 7-8 largest, leaving narrow space at base and apex, from 9 apically gradually smaller, on 12 smallest, about 1/4 the length of the segment, on 9-11 leaving narrow space at base and apex, because from 8 apically each segment itself gradually shorter till 12, A13 without rhinaria. Increasing length order of abscissae of radial vein: 5,2,3=1,4, 5:3=1:2, sometimes 5=2. Apical margin of clypeus: Fig. 8, medial produced part markedly broad, at lateral corners incrassate, slightly produced and appears reflected, rest of apical margin thin and medianly minutely and shallowly incised, on both sides of the incision, for a considerable extent, gently reflected, reflected area smooth and polished, but broad basal part of bevelled area fairly closely covered with medium-sized punctures. Mandible minutely, roundly and shallowly excised on outer margin beneath before middle. Pronotum depressed much below level of mesoscutum, mesoscutum medianly broadly furrowed, the furrow shallower posteriorly and not reaching apex, scutellum and postscutellum medianly distinctly impressed; propodeum without median and lateral carinae, medianly shallowly furrowed, GT7 with lateral margins on posterior portion strongly reflected into carinae, with apex broadly and roundly emarginate (Fig. 9).

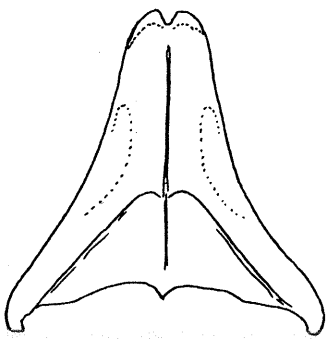
Sternite 8: Fig. 10. Genitalia in ventral view: Fig. 11, in lateral view: Fig. 12, basiparamere provided with a lamellate appendage (lA) its apical marginal area translucent pale yellow (t), paramere at base and above lA slightly expanded ventrally, forming hair-supporting area (Fig. 12), whence a broad tuft of long, thick and brown hair arising, at inner margin of the tuft the hair in some light cupreously shining, left volsella seen from left side: Fig. 13.



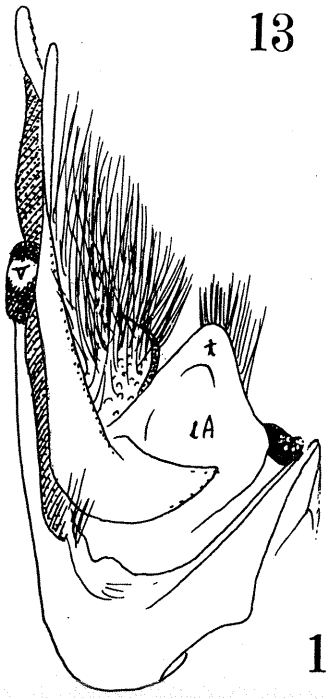
11



13



10



12

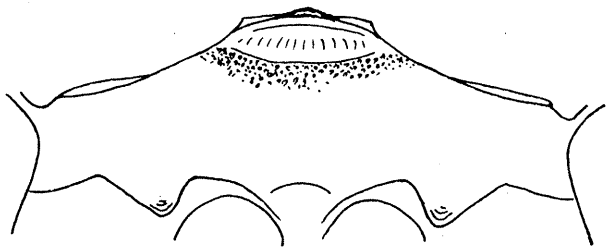
6. LIRIS (MOTES) LARROIDES (WILLIAMS, 1928)

Motes larroides Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 69, 1928 (♀ ♂, Philippines and Singapore, 8 figs.).
(Motes larroides taiwanus Tsuneki, Etizenia, 20: 25, 1967, ♀ ♂, Formosa, 8 figs.).
Liris (Motes) larroides: Bohart & Menke, World Sphecid., p. 246, 1976 (listed).

Specimen examined: 1 ♂, Luzon, Prov. Albay, Manito, 18.VIII.1978, T. Murota.

Remarks. The differences in the Formosan specimens from the Philippines upon which ssp. taiwanus was erected were confirmed as far as the male is concerned. Certainly the pile band on GT4 is present in the Philippine specimen before me, but it is narrower than others and not complete. The appressed hair on head is without golden effulgence. Antennal rhinaria on A5 only, elongate oval, leaving a short space at base (shorter) and at apex (longer). HW:IODv=100:25. IODv,IODc,A2,A3=10,18,5,7. A3,4,5=10,10,9.5. Clypeus: Fig. 14. Hind tibial longitudinal ridge at dorso-outer corner is fairly acute, thorough, but not so highly raised as to be called fin-like, carrying a single spine only beyond middle in this specimen.

Structure of the genital organs and GS8 were already given roughly by Williams and in detail by me (Tsuneki, 1967, in relation to Formosan subspecies).



14

7. LIRIS (PITALIRIS) PITAMAWA (ROHWER, 1919)

Cratolarra pitamawa Rohwer, B 11. Exp. Sta. Hawn. S.P.A., Ent. Ser., 14: 7, 1919 (♀,
Notogonidea (Cratolarra) pitamawa: Williams, Ibid., 19: 80, 1928 (♀ ♂, Philippines, Borneo, Singapore, Malay Peninsula).
Cratolarra pitamawa: Tsuneki, Etizenia, 17: 8, 1966 (♀ ♂, Formosa).
Liris (Cratolarra) pitamawa: Tsuneki, Ibid., 20: 41, 1967; Ibid., 55: 2, 1971; Steenstrupia, 4: 59, 1976 (Palawan and Tawi Tawi); Japanese authors, 1967-76 (Formosa).
Liris (Leptolarra) pitamawa: Bohart & Menke, World Sphecid., p. 247, 1976 (listed).
Liris (Pitaliris) pitamawa: Tsuneki, SPJHA, 23: 26, 1982 (new subgenus).

Specimens examined: 2 ♀, Luzon, 2 ♀ 1 ♂, Cebu, 1 ♂, Negros, 7 ♀ 3 ♂, Mindanao;

Luzon: 1 ♀, Mountain Prov., Bontoc, 850 m, 29-30.XII.1979, T.Murota; 1 ♀, Laguna Prov., Los Banos, 31.III.1978, T.Tano; 2 ♀ 1 ♂
Cebu: 2 ♀ 1 ♂, Cantabaco, 30.III.1979, C.Nozaka.
Negros: 1 ♂, Mambucal, 2-3.IV.1979, H.Kurokawa.
Mindanao: 6 ♀ 3 ♂, Zamboanga (Pasonanca Park, Bolong beach, suburbs), 30.VII.-2.VIII.1980, H.Kurokawa(2 ♀), T.Tano(1 ♀ 1 ♂), T.Murota(3 ♀ 2 ♂); 1 ♀, Bucidnon, Malay-Balay, 800 m, T.Tano.

Notes on some characters.

Body wholly and legs densely covered with short appressed silky white pubescence, bearing velvety shine, on propodeum pubescence slightly long and dense. Punctures on mesoscutum and mesopleuron very fine and close, under 50× magnification punctures closely arranged in oblique or transverse lines (punctures slightly larger in ♂), on scutellum punctures somewhat sparse. Dorsum of propodeum with weak median carina, more or less varied in length, surface dull and weakly minutely and irregularly reticulate, sometimes strong rugae scattered sparsely, as a rule without lateral carinae, except short strong one on each apical side of posterior aspect, but sometimes especially in ♀ weak intermittent ones at postero-lateral parts of dorsum and in ♀♂ at dorso-lateral parts of pos-

terior parts of posterior aspect observed, usually at lateral parts of dorsum a longitudinal series of short, sparse, transverse carinulae present, posterior aspect transversely, fairly closely striate, striae on dorsal and lateral areas stronger and more distinct.

Relative width of IODv to width of head is considerably variable, generally smaller insects have relatively wider IODv as given in Table 1. Rhinaria on antennal joints in ♀ are usually on 6–11 present, but sometimes on 6, or on 6–7 lacking, even when present very small on these joints, on the rest about a third the length of respective joint, very shallow and weak, not distinct and difficult to observe. Apical spines of pygidial area 4 in number, inner pair longer and outer ones slightly shorter, when 2 or 3 spines alone are observed, one or two of them must have been lost.

Table 1. Variation in characters of Liris pitamawa (Rohwer)

Sex	Loco	Size	IODv	IODv:IODc:A2 : A3	A2:A3:A4:A5	R. or P.	PLC	PA
♀	Min.	10.5	19	20 50 - 22	10 20 19 18	A7-11	o	i w
♀	Min.	11.5	19	20 49 - 20	10 20 20 20	A8-11	o	i w
♀	Min.	9.8	20	20 47 - 19	11 20 19 19	A8-11	o	i w
♀*	Min.	8.5	22	20 42 - 17	11 20 18 18	A7-10	-	- -
♀	Min.	11.0	19	20 46 - 19	11 20 19 19	A8-11	-	- w
♀	Min.	10.5	20	20 46 - 20	10 20 18 18	A6-11	-	- w
♀	Min.	9.0	20	20 47 - 19	11 20 18 18	A6-11	-	- w
♀	Cebu	10.5	20	20 48 - 19	10 20 19 19	A6-11	-	- -
♀	Cebu	6.7	21	20 48 - 18	10 20 20 18	A6-11	-	- -
♀	Luz.	9.0	20	20 48 - 19	11 20 18 18	A7-11	-	- -
♀	Luz.	7.5	22	20 44 - 17	11 20 21 20	A6-11	-	- -
♂	Min.	7.0	23	20 44 8 13	12 20 22 23	A4-13	-	- w
♂	Min.	6.3	24	20 44 8 11	13 20 22 24	A4-13	-	- -
♂	Min.	7.0	24	20 40 8 11	13 20 22 24	A4-13	-	- w
♂	Cebu	7.3	24	20 39 7 10	14 20 22 24	A4-13	-	- -
♂	Neg.	5.0	27	20 40 7 10	14 20 20 20	A4-13	-	- -

Remarks. IODv ... Ratio to HW as 100. IODv:IODc:A2:A3 ... Length ratio when IODv is 20. A2:A3:A4:A5 ... Length ratio when A3 is 20. R ... Rhinaria in ♀. P ... Placoid in ♂. PLC ... Propodeal lateral carina, when present o, when absent -, when intermittent i. PA ... Posterior aspect of propodeum, when weak carina partly present w, when not -.

As to the detailed structure of the clypeus (♀ ♂), pygidial area (♀), sternite 8 (♂) and genital organs (♂) see Tsuneki, 1967 (p. 41). Here the right half of the genitalia (ventral view) in one of the Philippine specimens are given in the following page.

8. LIRIS (PITALIRIS) FLAVIPENNIS (WILLIAMS, 1928)

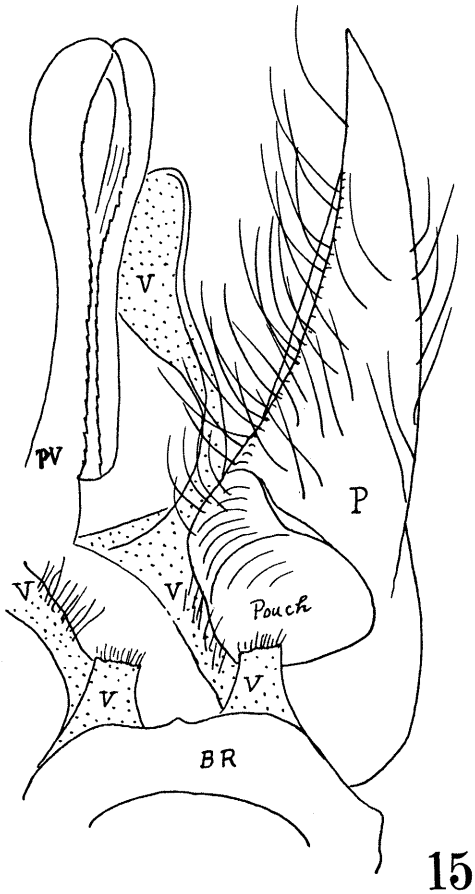
Notogonidea (Cratolarra) flavipennis Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 81, 1928 (9 ♀ 3 ♂, Luzon).
Liris (Cratolarra) flavipennis: Tsuneki, Steenstrupia (Copenhagen), 4: 59, 1976 (18 ♀ 2 ♂, Palawan, 2 ♀, Balabac).
Liris (Leptolarra) flavipennis: Bohart & Menke, World Sphecid., p. 245, 1976 (listed).

Specimens examined: 2 ♂, Luzon, Naguilian, river bed, near Baguio, 28.III.1978, T.Tano and T.Murota. 1 ♂, Mindanao, Makahambus Cave, Cagayan de Oro, 15–16.VIII.1980, T.Murota. Mindanao is the first record of the distribution of the species.

Remarks. In the specimens above listed the placoid of antenna, structure of clypeus, punctures on mesoscutum and scutellum, sculpture of propodeum are as in the preceding species. Median carina on propodeal dorsum weak, variable in length and frequently intermittent, lateral carinae lacking, instead sparse transverse carinulae more or less stronger and higher at the place. Median sulcus of posterior aspect divergent upwards, but shallow and not conspicuous, but the transverse carina at the top of the aspect very distinct, gently incurved above the sulcus.

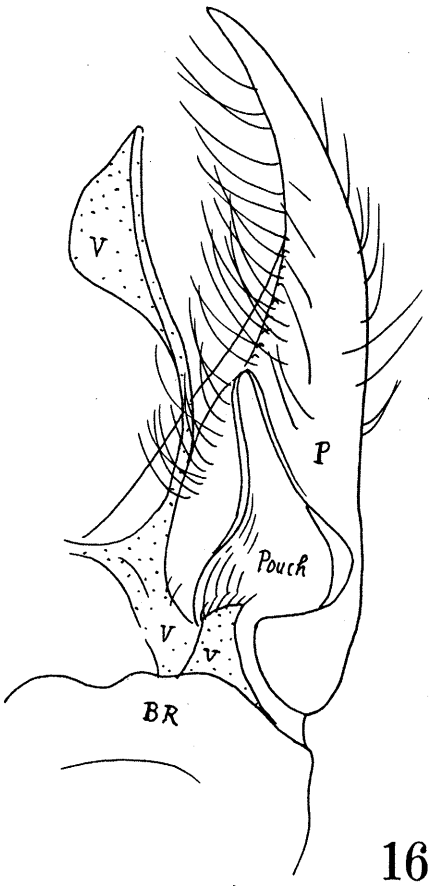
Measurements (in the order of Luzon, Luzon, Mindanao specimens):
HW:IODv=100:25, 25, 25. IODv,IODc,A2,A3=10,20,6,4, 10,20,6,3.5, 10,20,6,4. A3,4,5=10,11,11, 10,11,11, 10,12,12.

Apical incision of sternite 8 is distinctly triangular. Genitalia similar in general pattern of structure to those of pitamawa, but markedly different from those in the



15

pitamawa



16

flavipennis

structure of basiparamere on the ventral surface. Basiparamere swollen, involving an empty pouch or cave within, the entrance of which is open to ventral side, which is in pitamawa nearly rounded, complete and not split, while in flavipennis it is elongate, angulate on top and deeply split along basal ring (Fig. 16, cf. Fig. 15 in pitamawa).

9. LIRIS (LEPTOLARRA) PHILIPPINICUS TSUNEKI, 1982

Notogonidea liroides Williams (nec Turner, 1913), Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser. 19: 72, 1928 (9 ♀ 5 ♂, Luzon, Samar, Sibuyan, Iligan, Mindanao and Basilan).
Liris (Notogonidea) liroides thaiana Tsuneki, Etizenia, 4: 9, 1963 (1 ♀, Thailand).
Liris (Leptolarra) thaiana: Bohart & Menke, World Sphecid., p. 248, 1976 (n. comb.).
Liris (Leptolarra) philippinica Tsuneki, SPJHA, 19: 21, 1982 (different from thaiana and renamed, with n. ssp. yalomensis).

Specimens examined: 2 ♀ 3 ♂, Luzon; 3 ♂, Negros; 1 ♀, Mindanao:
2 ♂, Asin Apa, 600 m, 2.I.1980, T.Murota; 2 ♀, Baguio City, Mines View Park, 1500 m, 3.I.1980, T.Murota; 1 ♂, Prov. La Union, San Fernando, sand beach, 27.III.1978, T. Tano. 3 ♂, Negros, Mambucal, 2-3.IV.1979, T.Tano & H.Kurokawa. 1 ♀, Mindanao, North Cotabato, Mt. Apo, 1000-1500 m, 9.VIII.1980, C.Nozaka.

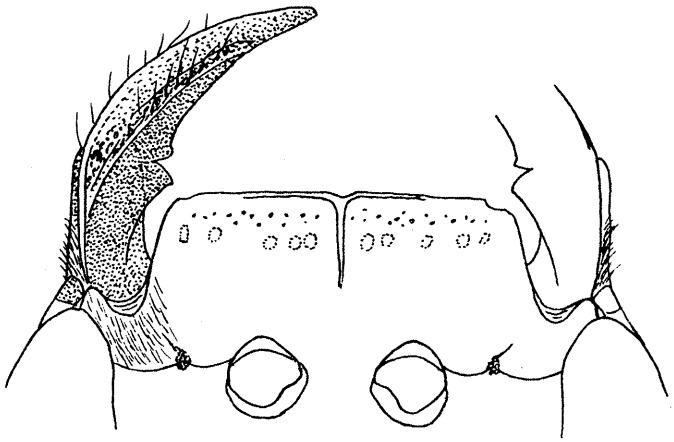
Generally well agree with the interpretation of Williams (1928). Some comments:

Punctation and sculpture. Mesoscutum with a broad furrow medio-anteriorly; in ♀ punctures fine, rounded, shallow, flat-bottomed and rather sparse, with PIS microcoriaceous, not shining, on median furrow punctures slightly smaller and much weaker; in ♂ punctures on anterior part outside medial furrow much stronger, deeper and closer than in ♀, PIS highly raised to fine ridges and microcoriaceous, on medio-anterior furrow and extreme anterior margin punctures finer, weaker and closer. As a whole surface condition is rather closer to nigricans-group than to memnonia-group. Punctation of mesopleuron similar. Median carina of propodeal dorsum always present, but varied in extent, sometimes about half the dorsal length, sometimes reaching close to apex, but never to apical margin; medio-apical part always longitudinally furrowed, the furrow extended anteriorly on to both sides of medial carina; dorsal and posterior aspects separated from each other by a transverse arcuate carina, lateral carinae distinct on both aspects, strengthened further by nodules arisen from the conjunction with transverse carinae that are developed on lateral areas of both aspects, on dorsal aspect the carinae finely, weakly, rugosely extended inwards and connected with medial carina. Thus dorsal surface transversely, finely rugoso-atriate, with intervals closely filled with fine rounded punctures; the sculpture much coarser in ♂ than in ♀ in which transverse striae much weaker and indistinct inwards, as a result broad central area appears simply reticulated.

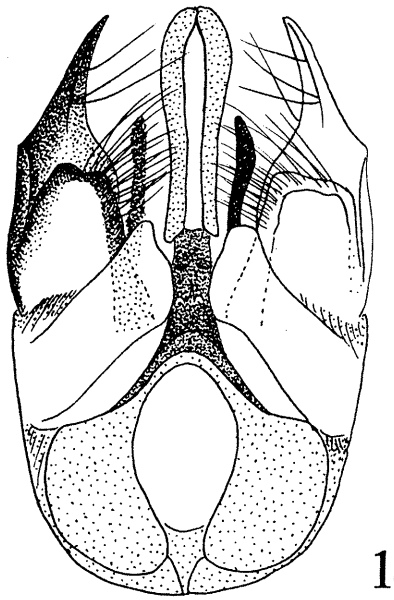
Length relation of abscissae of radial vein. Considerably varied as usual. In ♀ usually as given by Williams (1928 under liroides), namely with increasing order 5,2,3, 1,4, but sometimes 2,5,3,1,4 and in ♂ more markedly variable, sometimes 2=5, 2 5, 2 5, 2=3=5, and 1=4.

Clypeal form. In both sexes as given by Williams (1928, his Figure 67). In the female before me: Fig. 17. Always without bevel, but sometimes apical shining margin is separated from the disc by a sparsely punctured fine furrow, but sometimes the furrow indistinct.

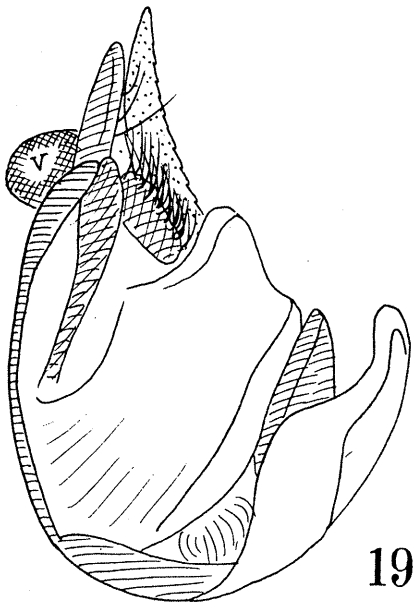
Antenna. A3 in dorsal view rather suddenly incrassate at apex, in lateral view smoothly so apically (♀ ♂). In ♀ rhinaria are on A5-11 present, oval in form, flat-bottomed, shining, mostly as large as fore ocellus, but on 5 and 11 small, on 11 sometimes obscure or com-



17



18



19

pletely lacking, on 8 largest, with length axis about 1/5 the length of the segment. In ♂ placoids are on A4-12 present, on 13 absent.

Measurements: HW,IODv,A3=100,19,21(♀), =100,25,16(♂). IODv:IODc=10:28(♀), =10:23 (♂). A2,3,4,5=4,10,11,11.5(♀), =5,10,10,10.5(♂). A3=AW×3(♀), =AW×2.2(♂).

Apical margin of sternite 8 gently emarginate.

Genitalia seen from beneath: Fig. 18, seen from left side: Fig. 19. Characteritic is that the black-chitinized parts are markedly narrow, basiparamere broadly lamellate and whitish, with a broad lamella produced inwards. The hair is also small in number, but they are thick, bristle-like and golden in colour and glittering.

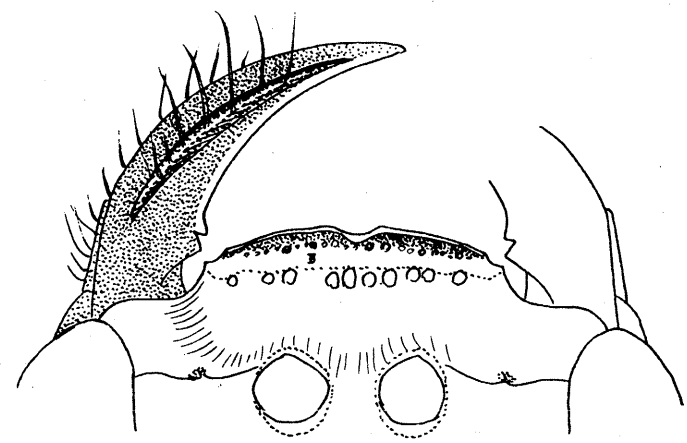
10. LIRIS (LEPTOLARRA) BAGUIONIS SP. NOV.

The present species (♀) very closely resembles the preceding, having long soft and sparse hair on head and thorax-complex and is likely to be confused with this, but it can be separated from philippinicus by the following differences:

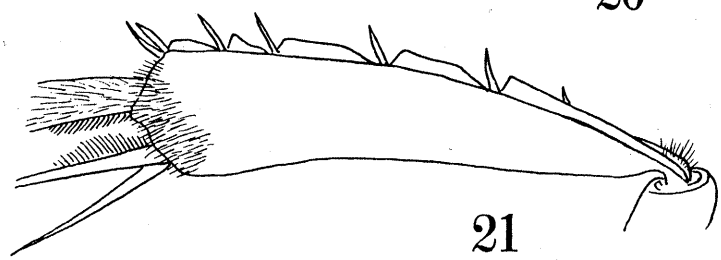
(1) Structure of clypeus (Fig. 20, cf. Fig. 17 in philippinicus). Medial area much less strongly produced anteriorly than in the compared species, with apical margin distinctly rounded out (medianly minutely emarginate), lateral areas relatively broader, anteriorly distinct bevel (B in Fig. 20) present (in phil. no) which is microcoriaceous, apical marginal area smooth and polished, distinctly reflected and bordered from bevel with a puncture-line, large punctures behind bevel (corresponding to "scattered punctures across middle" of phil.) stronger and more numerous, disc without medial carina.

(2) Antennal scape (=A1) unicarinate in front, without pilous flattened area anteriorly (in phil. bicarinate and between the carinae a flattened pilose area present).

(3) Mandible (in Fig. 20) with inner margin translucent ferruginous, hairs stronger, bristle-like, much longer and pale brownish (in phil. - cf. Fig. 17 - wholly black, hairs shorter, sparser and whitish).



20



21

(4) Punctures on mesoscutum much finer and closer, minutely reticulate (in phil. somewhat larger, slightly sparser, with more or less PIS where delicately microcoriaceous.

(5) Propodeal dorsum without lateral carinae, surface much more coarsely transversely rugoso-striate, with interspaces irregularly sectioned with short weak longitudinal rugulae into subreticulation, transverse striae stronger at lateral and posterior marginal areas, median carina long, distinct, but not reaching apex, accompanied on each side with a fine groove, the groove connected posteriorly with medio-apical furrow that is much less strong than in phil. Posterior aspect with lateral carinae posteriorly, with a few transverse strong and coarse rugae upwards; sides anteriorly obliquely, sparsely and weakly rugoso-striate, striae posteriorly very weak, close and rather indistinct (in phil. dorsum with lateral carinae, surface much more finely, closely, transversely rugoso-striate, striae on lateral areas stronger and sparser, connected with lateral carinae, on broad median disc rather finely rugoso-reticulate, though main striae are transverse, posterior aspect generally similar, but the sculpture considerably variable, sides obliquely, more finely and closely striate over much broader range.

(6) Gastral tergite 5. Apical area closely covered with somewhat long ferruginous hair, mixed with sparse longer ones, especially 4 hairs on lateral areas remarkable,

these are much longer, stronger, bristle-like and dark brown in colour; ante-apical transverse series of 4 hairs of GS2,3,4 and 5 are also long and bristle-like (in phil. hair on GT5 weak, indistinct and long hair on sternites also shorter and less strong).

(7) Pygidial area. In form similar to phil. but the covering appressed hair much longer, denser and dark brown in colour with coppery shine in some light (in phil. the hair short, less dense, pale yellow in colour, with brassy lustre in some light), half erected, sparse bristles much thicker, rather spine-like, similar in colour to appressed hair (in phil. soft, not so long, pale yellow in colour).

(8) Antenna shorter and robuster than in phil., each joint about thrice as long as wide (in phil., except A3, each joint about 4 times as long as wide); rhinaria on A7-11 present (in phil. on A5-11), oval in form, flat-bottomed, on 7 and 11 very small, like a minute puncture (but shining), on 8-10 also small, spot-like with length axis about half the diameter of fore ocellus; generally smaller than in phil.

(9) Legs. Fore tibia without spine on antero-outer blunt ridge (in phil. always strongly spinose, varied in number individually, usually from 2 to 4), all Tl relatively longer. Hind tibia with postero-outer ridge highly raised between spines, lamellate like a fin (Fig. 21).

Otherwise very similar in general. Measurements (within parenthesis phil.): Length 11.5 mm. HW,IODv,A3=100,18,18 (100,19,21). IODv:IODc=10:29 (10:28). A2, 3,4,5=5,10,10,9.5 (4,10,11,11.5). A3=AW×3 (AW×3). CML:Cll=20:8 (20:8).

♂, unknown.

Holotype: ♀, Luzon, Baguio-City, mines View Park, 1500 m, 1.I.1980, T.Murota.

11. LIRIS (LEPTOLARRA) LABORIOSUS (SMITH, 1856)

Larrada laboriosa Smith, Cat. Hym. Brit. Mus., 4: 278, 1856 (♀, Philippines: ... mesothorax and scutellum shining, ... wings smoky hyaline, nervures black ...).

?Notogonia laboriosa: Bingham, Faun. Brit. Ind., Hym., I: 204, 1897 (... scutellum impunctate, polished and shining, ... abdomen smooth and shining except pruinose bands at apical margins of Gl-4, ... pygidial area covered with stiff black pubescence ...).

Notogonia crawfordi Rohwer, Proc. U. S. Nat. Mus., 37: 659, 1910 (♀, after Bohart and Menke, 1976)

Notogonidea laboriosa: Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 73, 1928 ♀ ♂, widely in Philippines, and also in Formosa, Japan, Riukiu, India ... wings with a strong yellowish tinge, ... abdomen with four incomplete silky white bands ... pygidium ... covered with fine golden pubescence and with scant, delicate, short, erect hairs, pile of body yellowish white... Figs. of clypeus (♀ ♂), male genitalia and sternite 8).

Notogonidea laboriosa: Williams, Ann. Mag. Nat. Hist., (10) 18: 125, 1936 (1 ♀, Solomon Is.: Russel Is.).

Motes laboriosa: Krombein, Proc. Hawn. Ent. Soc., 13 (3): 282 (keyed), 394, 1949 (♀ ♂, Mariana).

Liris (Dociliris) laboriosa: Tsuneki, Etizenia, 20: 30, 1967 (♀ ♂, Formosa, redescr. w. figs. of clypeus (♂), mid and hind femora, analytical figs. of male genitalia).

Liris (Dociliris) laboriosa: Tsuneki, Ibid., 55: 4, 1971 (1 ♀ 13 ♂, Formosa); Japanese authors, 1971-77 (Formosa).

Liris (Dociliris) laboriosa: Tsuneki, Steenstrupia, 4: 64, 1976 (5 ♀ 1 ♂, Tawi Tawi; 1 ♀, Mindanao, figs. of male epipygium).

Liris (Leptolarra) laboriosa: Bohart & Menke, World Sphecid., p. 245, 1976 (listed).

Liris (Leptolarra) laboriosa: Tsuneki, SPJHA, 19: 17(♂), 18(♀), 1982 (keyed, ♀ ♂, Solomon Is.).

Specimens examined: 4 ♀ 5 ♂, Luzon; 1 ♀, Cebu; 2 ♂, Negros; 1 ♂, Mindanao:
Luzon: 2 ♀, Prov. Camarinessur, Bano, 16.VIII.1978, T.Murota; 1 ♀, Prov. Laguna, Alaminos, Hidden Valley Spring, 6.VIII.1978, H.Kurokawa; 1♀ 1♂, Naguilian, near Baguio, river beach, 28.III.1978, T.Tano; 1 ♂, Prov. La Union, St.Fernando, river beach, 27. III.1978, T.Tano (smallest specimen); 1 ♂, same loco, 26.XII.1978, T.Murota.
Cebu: 1 ♀, Argao, 31.III.1979, H.Kurokawa.
Negros: 1 ♂, Mambucal, 2-3.IV.1979, T.Tano; 1 ♂, Taytay beach, 4-5.IV.1979, T.Tano.
Mindanao: 1 ♂, Zamboanga City, Balong beach, 1.VIII.1980, T.Tano (largest specimen).

Remarks. According to the original description (cf. characters given in the above references), the type is considered somewhat different from the usual interpretation of

L. laboriosus and the Bingham's species (do.) is distinctly different from the Williams'.

Williams does not mention that he observe the type of laboriosa, so it seems necessary to confirm the identity of the two specimens concerned.

Williams included Japan and the Ryukyus in the range of distribution of the present species, possibly by adopting the record of Matsumura et Uchida (1926) as pointed out by me in 1967. My examination of the questioned specimen of the latter authors, however, revealed that it was not laboriosus, but nothing else than L. docilis Smith, as had been presumed. At least, in so far as examined until now, no specimen of laboriosus has not been found from Japan and the Ryukyus.

On some characters. In ♀ rhinaria on A6–10, suboval in form, small, on 6 like a puncture, even the largest on 8 with the length axis only about 1/7 of the segment; in ♂ placoids on A4–12. Punctures on mesoscutum under 60× magnification very fine and very close, appearing transversely or obliquely, linearly arranged according to the direction observed, in ♂ very slightly more coarsely so, surface closely covered with appressed pubescence, especially densely so at lateral and posterior margins, forming a U-shaped pile band, the pubescence in ♀ silky white or pale yellowish, in ♂ pale brassy, brassy or nearly golden. Propodeum at base transversely furrowed and carinated, median longitudinal carina not strong, variable in length, sometimes very indistinct, surface transversely, finely, closely and very weakly rugoso-striate, sometimes striae very feeble and indistinct, striae intervals weakly and closely granulate or very minutely irregularly reticulate, surface always dull, not glossy (♀ ♂).

The male specimens are markedly varied in size. Of the Philippine specimens examined the largest reaches amply 12 mm, while the smallest is only 6.7 mm. Most frequent is 8–9 mm, yet they can easily be distinguished from other allied species by the combination of the following distinctions: Wings strongly yellowish, especially on basal area, antennal placoids on A4–12, fore femur broadly flattened beneath, hind femur markedly excavated beneath, with surface glabrous, IODv=A2+3, pubescence on propodeal dorsum is long, clypeus with distinct bevel, bearing a line of punctures across middle and the characteristic genitalial structure (see Tsuneki, 1967, p. 30).

12. LIRIS (LEPTOLARRA) LARRIFORMIS (WILLIAMS, 1928)

Notogonidea larriformis Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 73, 1928 (13 ♀ 6 ♂, Luzon, Samar, figs. of mandible - ♀, genitalia, GS8).
Liris (Notogonidea) larriformis: Tsuneki, Etizenia, 17: 4, 1966 (1 ♀, Formosa); Ibid., 20: 34, 1967 (do.).
Liris (Leptolarra) larriformis: Bohart & Menke, World Sphecid., p. 346, 1976 (listed).

Specimens examined: 1 ♀, Luzon, Prov. Laguna, Pagsanjan, river side, 2.IV.1978, T.Murota; 1 ♂, same loco,and date, T.Tano; 1 ♂, Prov. Albay, Manito, 16.VIII.1978, T. Murota.

Remarks. Antennal rhinaria in ♀ are on A6–11 present, very small on 6, on others also small; placoids in ♂ are on A5–9 in both specimens, on 9 very small, located at base. HW,IODv,A3=100,20,16(♀), =100,24,14(♂). A2,3,4,5=6,10,10,10(♀), =5,10,9,9(♂). IODv:IODc=10:25(♀), =10:21(♂). Dorsum of propodeum with lateral carinae, with nods at the junctions woth transverse carinae.

From both the male specimens the genitalia were not extracted, so I tried to take them out. Strange to say from both the organs could not be discovered, although I finally dissected the gaster completely to search for them. Do the organs drop off after copulation in this species? While, sternite 8 were in situ in both, which is gently emarginate at apex.

Punctures on mesoscutum under 60× magnification very fine and close, but well outlined, fairly deep and distinct, in some places, however, punctures obliquely closely arranged and appearing rugosely confluented, generally PIS shining, but fairly densely covered with appressed pubescence and apparently not shining (♀ ♂), the pubescence on broad central area cupreous in certain light in ♀, in ♂ pubescence less dense, somewhat thick and short, hence surface more shining than in ♀. Scutellum similarly punctured, but pubescence shorter and less marked. Propodeum at extreme base with a fine transverse groove which is margined posteriorly with an arcuate carina, median strong carina started from this and extended posteriorly (in ♂ shorter), but not reaching apical margin, disc transversely, fairly closely rugoso-striate, striae coarser in ♂, with interspaces very finely and weakly rugulose, also coarser in ♂ and surface more shining in ♂. Lateral carinae distinct (♀ ♂), with nods at the junction with transverse striae of dorsum.

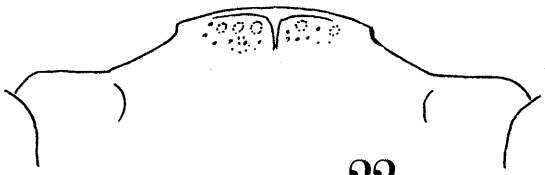
13. LIRIS (LEPTOLARRA) NEGROSENSIS (WILLIAMS, 1928)

Notogonidea negrosensis Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 74, 1928 (9 ♂, Negros, Luzon, Palawan, Singapore, figs. of clypeus, antenna, genitalia and GS8). Tsunaki, 1974, p. 613 (♀♂, Thailand).
Liris (Leptolarra) negrosensis: Bohart & Menke, World Sphecid., p. 246, 1976 (listed).

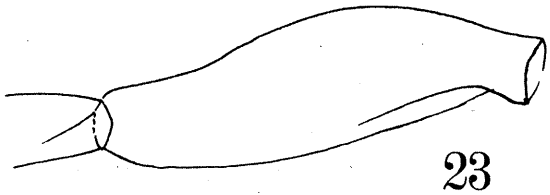
Specimens examined: 1 ♀ 3 ♂, Luzon: 1 ♀ 2 ♂, Prov. Laguna, Los Banos, Mt. Makiling, Valley, 29.III.1978, T.Tano; 1 ♂, Asin Spa, 1500 m, 16 km from Baguio City, 5.I.1980, T.Murota.

Because of the facts that the male specimens examined well agree in characters with negrosensis, as far as the original description goes, especially the form of the clypeus is well consistent and the genital organs are similar in general pattern of the structure to the figure of Williams, although his figure is not detailed, the specimens together with a closely resembling female that is collected in the same place and at the same time are identified with this species. But if this determination is not incorrect the original author comes to have overlooked an important character of the species, that is, the dorsal aspect of the head is nearly flat, very close to the state of the genus Dicranorhina: The depressions around fore ocellus and behind ocellar area are very shallow, the elevations at anterior verge on both sides of medial furrow of frons, at ocellar area and at posterior vertex are very weak, and the lateral ridges along inner orbits are much weaker than usual.

Supplements to the explanation of ♂. Apical margin of clypeus: Fig. 22, fore femur in posterior view normally rounded out beneath, but in frontal view antero-ventral surface at apical 2/3 broadly excavated (Fig. 23). Hind tibia bicarinate as usual, anterior carina rather blunt, with 3 spines, while the posterior one acute, but with only a single spine. In dorsal view HW,HL,IODv,A3=100,53,21,12. A2,3,4,5=8,10,12,12. A3=AW×1.5. IODv:IODc=10:26. Placoids on A4–13. Head in dorsal view eyes not close to occipital margin, the space about as wide as half the length of A3. Inner orbits seen in

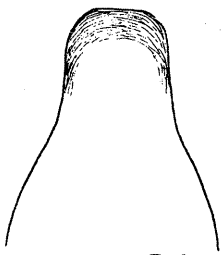


22



23

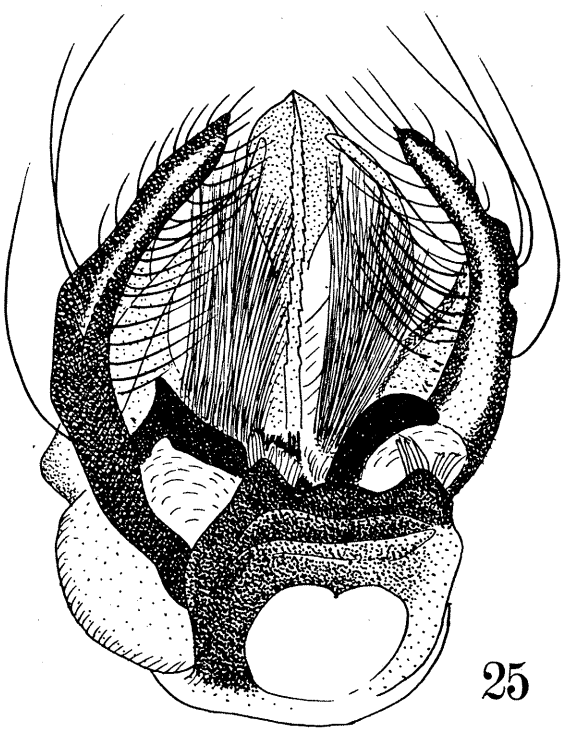
front outcurved, on lower part slightly convergent towards IODc, thence divergent to bases of mandibles. Pronotum somewhat thick, triangularly wedged into mesoscutum. GS8:



24

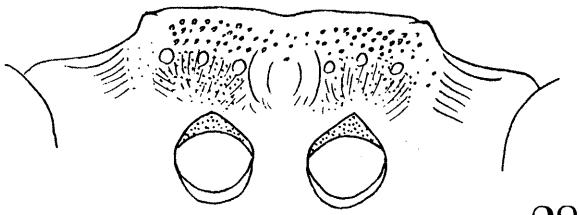
Fig. 24. Genitalia seen obliquely from beneath: Fig. 25, from above (dorsal side): Fig. 26. Paramere at both marginal areas strongly chitinized, black, provided with a series of long and strong setae on inner margin and 3 very long curved bristles on outer margin. Volsella very complicate, right-hand one seen from inside: Fig. 27, consisting of half-chitinized main body, with a very slenderly long extended process at dorsal end, and a transversely stretched well chitinized, up-curved blackish bridge at anterior end (Fig. 27, lateral and Fig. 25, ventral) which is attached beneath with a not well chitinized pale yellowish wadding and a short series of short hairs arising near its base (Figs. 25); from dorsal part of main body a tuft of very remarkable, long, pale yellowish bristles arising (Figs. 25 and 27). Well chitinized basal ring (cardo) is also very characteristic in form, bearing a triangular lamina that is fringed with hair, on each side of the median top (Fig. 25). Williams' figure of genitalia shows the dorsal process and the ventral arm of the volsella, similar in general form to those given here.

In fore wing radial cell comparatively broad, Maximum L:W=5:2, transverse radial vein (=A5) sometimes slightly obliquely inclined towards base, sometimes vertical to costa and sometimes somethat inclined towards apex, showing that this character can not be considered as specific. Abscissae 1,2,3,5 of radial vein in 3 specimens examined are subequal in length to each other and abscissa 4 is about double their length, but strictly relative length more or less varied individually, sometimes abscissa 2 or 3 slightly shorter and abscissa 1 slightly longer than others.

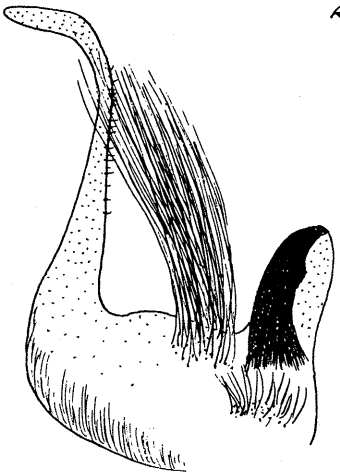


25

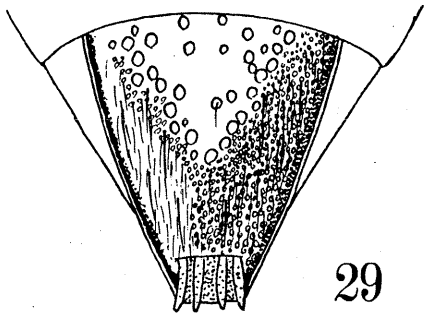
26



28



27



29

Figs. 25 - 29.
Liris (Leptolarra) negrosensis Williams
25-27 ... ♂, 28-29 ... ♀.

Mesoscutum finely punctate-reticulate, punctures somewhat larger than in laboriosus, rounded and uniform, appearing linearly arranged; mesopleuron similar, with punctures apparently longitudinally arranged; covering hair on scutum very short and fine, not conspicuous, on pleuron and sternum similar, but in oblique light showing a silky velvety shine, the U-shaped pile band at the marginal areas of scutum unobserved. Propodeal dorsum somewhat coarsely rugoso-reticulate, meshes irregular in form, but generally similar in size, with bottom not smooth and polished, sometimes rugulae partly longitudinally strengthened into somewhat distinct rugosed striae, median carina not strong, but distinct, reaching near apical margin, lateral carinae strong, rugosed, posterior inclination transversely coarsely rugoso-striate, lateral margins strongly raised into distinct straight carinae.

Body wholly black, mandible apically reddish brown, tegula and tarsi somewhat brownish. Hair silvery, everywhere short, not marked, pile bands on gaster weak, on G1-3 observed. Wings slightly darkened, apical marginal area distinctly so.

Small species, measuring 5-6 mm in length.

♀ ~~(hitherto unknown)~~. Slightly larger and robuster than ♂, about 6.5 mm. Generally similar to ♂, especially in the structure of head above. Clypeus: Fig. 28, short and relatively broader than in ♂, without bevel, apical marginal area of median lobe smooth and polished, and sparsely scattered with fine punctures behind there, disc with median elevation which is topped with a short blunt carina, on both sides of the elevation disc broadly depressed and then roundly raised again on both ends of median lobe, lateral lobes markedly depressed, on anterior margin of the depressions of median lobe a transverse series of a few gross but shallow punctures present (Fig. 28). IODv relatively short and antennal joints relatively slightly longer than in ♂: HW,HL,IODv,A3=100,53, 15,14. A2,3,4,5=7,10,11,11. IODv:IODc=10:30. Inner orbits sinuate as in ♂. A3=AW×2.5, rhinaria on A6-12, elongate rounded in form, on A6 about 1/5, on A12 about 1/4 of each segment, on A8-12 similar in size.

Structure of pronotum and punctuation on mesothorax and sculpture of propodeum similar to those of ♂, but fore wing considerably different from that of ♂. It has an obscure dusky band beyond middle, though very faint, crossing apical part of radial cell, cubital cell2 and top area of discoidal cell 2; radial cell is with abscissae markedly different in relative length from that of ♂ (but it is not important), transverse cubital vein vertical to costa, relative length of abscissae 5,1,2,3,4 is, when A5=5, in the left wing 5, 4.5, 8, 4.5, 8, while in the right wing 5, 5, 7, 4, 8, but the relative length to width of the cell is similar, namely 5:2, that is, comparatively broad. Pile bands on GT1-3 present, but not marked. Pygidial area (Fig. 29) with relative length to basal width 3:2, with lateral margins very gently rounded, apical margin provided with a series of 4 short broad spines, surface at base broadly glabrous and the smooth area extended triangularly deep into the haired area and surrounded and scattered with large punctures, appressed ground hair brassy in colour and half erected bristles not spine-like, very sparse. Hind tibia bicarinate, anterior carina rather blunt, carrying four short spines, posterior carina acute, but not finned, with three short spines.

Colouration as in ♂.

DIFFICULT PROBLEM REGARDING

14. LIRIS (LEPTOLARRA) SUBTESSELLATUS (SMITH, 1856)

AND

15. LIRIS (LEPTOLARRA) DOCILIS (SMITH, 1873)

Larrada subtessellata Smith, Cat. Hym. Ins. Brit. Mus., IV: 277, 1856 (♀, India, Sumatra and Java).

Larrada docilis Smith, Trans. Ent. Soc. London, 2: 192, 1873 (♀, probably ♂, but not his ♂, Japan).

Notogonidea subtessellata: Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 76, 1928 (list of ref., redescr. figs., 300 ex. ♀ ♂, from Philippines, with others from Borneo, Singapore, Hongkong, Japan, including docilis within thecategory).

Liris (Dociliris) subtessellata: Tsuneki, Etizenia, 20: 32, 1967 (list of ref., 41 ♀ 164 ♂, Formosa, analytical figs. of genitalia, specimens with red hind femur).

Liris (Dociliris) docilis: Tsuneki, Ibid., p. 33, 1967 (ref. 30 ♀ 137 ♂, from Formosa and others from Japan).

Liris (Dociliris) subtessellata: Tsuneki, Steenstrupia, 4: 59, 1976 (25 ♀ 9 ♂, Philippines: Palawan, Balabac, Tawi Tawi and Mindanao, specimens with red hind femur).

Liris (Leptolarra) subtessellata: Bohart & Menke, World Sphecid., p. 248, 1976 (listed, syn. and distr.).

Liris (Leptolarra) docilis: Bohart & Menke, Ibid., p. 245, 1976 (ditto).

Liris (Leptolarra) subtessellata: Tsuneki, SPJHA, 19: 22, 1982 (1 ♂, New Ireland, 1 ♂, Lavongai Is. - ssp. -specimens with red hind femur).

Liris (Leptolarra) subtessellatus: Tsuneki, SPJHA, 23: 58, 1982 (1 ♀ 1 ♂, South Ryukyus).

F. X. Willlams in his study of the Philippine Larrinae considered subtessellatus (hind femur red) and docilis (hind femur black) to belong to a same species and placed both under the name of subtessellata Smith, without taking notice of the fact that the black-legged form corresponds with docilis Smith, first described from Japan. When I studied the Formosan populations of both the forms occurring flourishingly on the is-

land I separated the two based upon the different structure of the male genital organs and ascribed them to the respective species as they were originally described. Thus the matter appeared to have been clearly solved. When I sent my 1967 paper to Dr. Williams he accepted the result of my study and wrote that he had been wondered why the Hawaiian population that was introduced from the Philippines did not produce the red-legged form and his doubt was solved by my study. Certainly the figure of the male genitalia of his "subtessellata" (Fig. 145 on page 109 of his 1928 paper) is in reality that of docilis.

Since that time I have treated the red-legged form as subtessellata and black-legged form as docilis without throwing any doubt upon the identification, without reexamining the genital organs of the male.

Whereas, the problem has rearisen and in a very difficult form. As mentioned earlier, from almost all the male specimens collected by the Fukui Parties the genitalia and the 8th sternite had been extracted completely and exposed at the end of the abdomen. This careful preparation has brought about the discovery of the problem.

Of the 83 male specimens of believed docilis I examined the genitalia one by one only for confirmation's sake. However, I was quite surprised during the course to find out among them one specimen that had the genitalia of the subtessellatus type. Thenceforth I carefully examined the rest of the specimens and could find out further 4 specimens bearing the similar genitalia. So I at once examined the male specimens of believed subtessellatus which were markedly scarce in the collection, represented by only 3 males and one female. To my further surprise, all the male specimens had the genitalia of the docilis type.

That is to say, the Philippine male specimens of apparent docilis include within two different species, namely, docilis itself and subtessellatus, and the Philippine male specimens of apparent subtessellatus are in reality docilis, as far as my examination goes. But it seems highly probable that the apparent subtessellatus males may include also true subtessellatus when the numerous specimens are examined.

It is presumed that the fact is also true with the females.

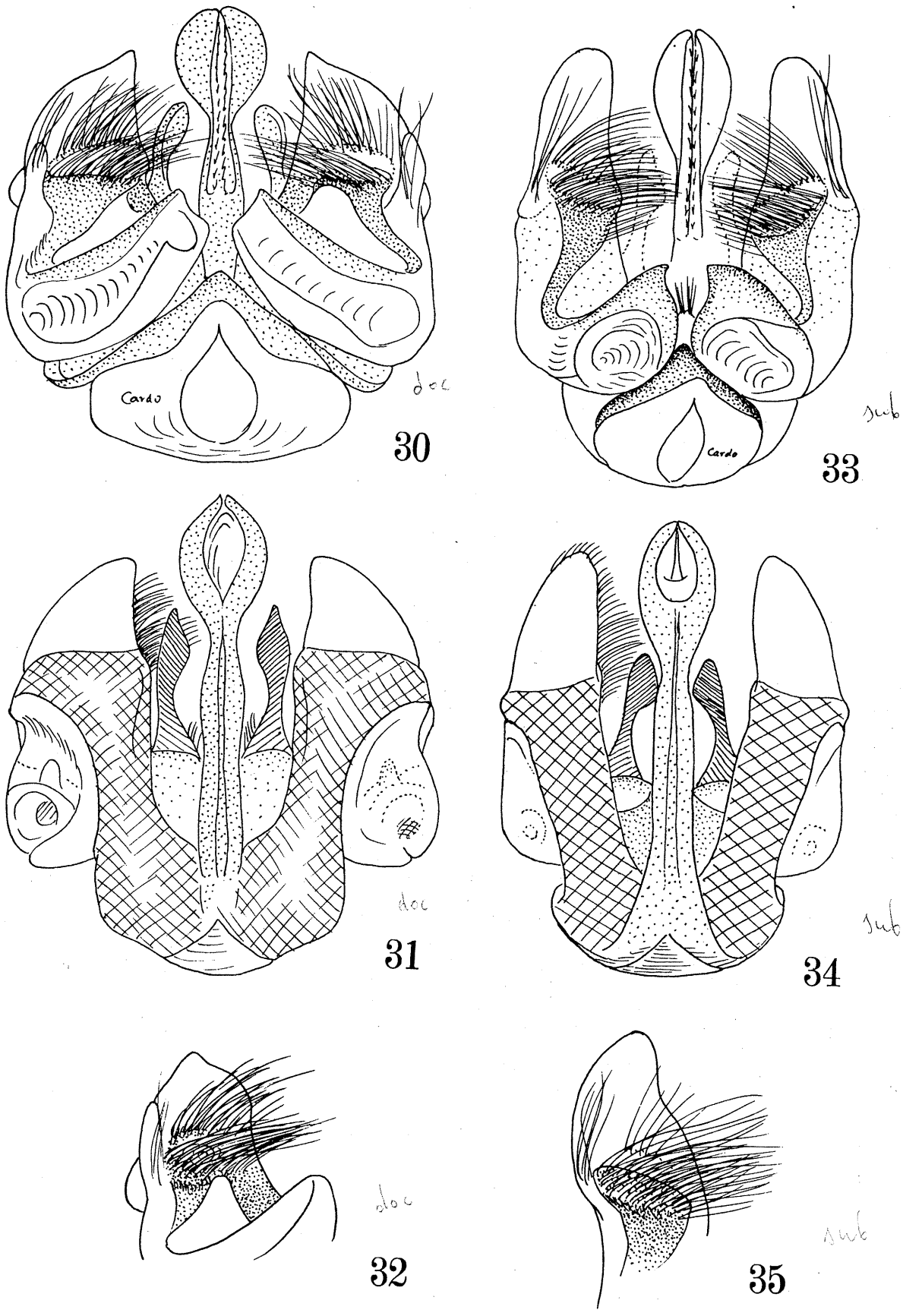
It is almost doubtless that the specimen bearing the genitalia of subtessellatus-type belong to a species different from that which has the genitalia of docilis type. Because the genitalia of the two types are markedly different from each other and there is no difficulty to separate one from the other, as given with illustrations in my 1967 paper. In short the genitalia of docilis is robust, broadly expanded laterally, with apical part of paramere shorter than width (Figs. 30 ventral, 31 dorsal), while those of subtessellatus slenderer, with apical part of paramere longer than width (Figs. 33 ventral, 34 dorsal). Furthermore, the black-pigmented support carrying a dense row of stiff hair that is attached to the inside of paramere below its apical part (see Figs. 30 and 33) is different in form between the two species (Fig. 32 in docilis and Fig. 35 in subtessellatus).

In order to compare the relationships I reexamined both forms of the Formosan specimens. Three sets of large-, medium-, and small-sized specimens of each form were sampled out, dissected and their genitalia were observed. In contrast to the Philippine population all the apparent docilis-specimens have the genitalia of docilis-type and all the apparent subtessellatus-specimens have those of subtessellatus-type without exception, as observed formerly at the time of my first investigation. The fact is also true with the Japanese specimens of the docilis-type (in Japan subtessellatus does not occur). As to the Formosan specimens, therefore, there is no question to separate the two species by the colour of the hind femur, but the method can not be applied to the Philippine specimens, because here the colour of the hind femur is not always linked with the genitalial characters.

In order to confirm the relationships in the apparent subtessellatus-specimens I requested the members of the Fukui Parties to send me further specimens of this type, because they did not send all the specimens of such common and easily distinguishable species as this. The result of the examination of the numerous newly sent specimens of this type confirmed that my presumation above mentioned was true.

Here, all the male specimens of the two types examined including two colour types of hind femur are listed below:

A. Apparent subtessellatus bearing red hind femur (but the red is considerably varied in extent, sometimes in part only):
   (1) Genitalia subtessellatus-type (= true subtessellatus): 17 ♂:
   16 ♂, Mindanao: 10 ♂, Zamboanga, Pasonanca Park, suburbs, 30.VII.-2.VIII. 1980, T.Murota; 6 ♂, Davao in the city, 3,6,10.VIII.1980, T.Murota.
   1 ♂, Luzon: Prov. Laguna, Pagsanjan, river beach, 1.IV.1978, T.Tano.
   (2) Genitalia docilis-type (in reality docilis): 32 ♂:



Figs. 30–35. Genitalia of L. docilis (30–32) and L. subtessellatus (33–35).

14 ♂, Mindanao: Zamboanga, Park, beach, suburbs and Davao, 30.VII.-6.VIII. 1980, C.Nozaka(1♂), H.Kurokawa(1♂), T.Murota(12♂).

18 ♂, Luzon: Prov. Laguna, Pagsanjan, 1.IV.1978, T.Murota(1♂); same loco, 7-9.VIII.1978, T.Murota(3♂), H.Kurokawa(1♂); Mountain Prov., Bontoc, 850-1000 m, 29-31.XII.1979, T.Murota(4♂); Asin Spa, 600 m, 16 km from Baguio, 25.I.1980, T.Murota(7♂); Prov. Launion, Naguilian, 4.I.1980, T.Murota(2♂).

B. Apparent docilis, bearing black hind femur.

(1) Genitalia docilis-type (= true docilis): 131 ♂:

58 ♂, Mindanao: Zamboanga, Park, beach, village and Davao, 30.VII.-6.VIII. 1980, T.Murota(42♂), H.Kurokawa(5♂), T.Tano(1♂); North Cotabato, Mt. Apo, 1000-1500 m, 9.VIII.1980, T.Murota(1♂); Bukidnon, Malaybalay, 700-800 m, 12-13.VIII.1980, T.Murota(7♂); Cagayan de Oro, Makambus Cave, 15-16.VIII.1980, T.Murota(2♂)

61 ♂, Luzon: Los Banos, 2-5.VIII., HiddenValley Spring, 6.VIII., Pagsanjan, 7-9.VIII., Baao, 16.VIII., Tabaco, 19.VIII.1978, C.Nozaka(1♂), H.Kurokawa(5♂), T.Murota(26♂); St.Fernando, 26.VII.1979, T.Murota(1♂); Mountain Prov.: Bontoc, Asin Spa, Baguio, 850-1500 m, 29.XII.1979-3.I.1980; LaUnion Prov.: Naguilian, 4.I.1980, T.Murota(28♂).

3 ♂, Cebu: Argao, 31.III.1979, T.Tano(1♂), C.Nozaka(2♂).

9 ♂, Negros: Mambucal, Taytay beach, 2-5.IV.1979, T.Tano(1♂), C.Nozaka(6♂), H.Kurokawa(2♂).

(2) Genitalia subtessellatus-type (= really subtessellatus): 47 ♂:

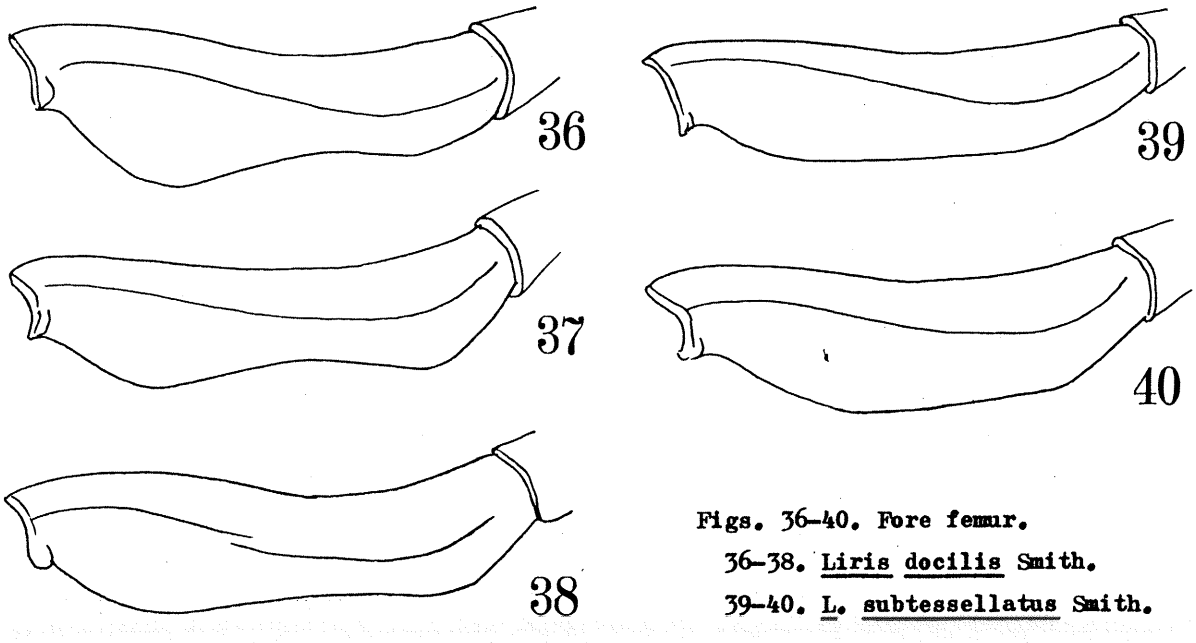
8 ♂, Mindanao: Zamboanga and Davao, 1-5.VIII.1980, T.Murota(7♂), H.Kurokawa (1♂).

36 ♂, Luzon: Bagui, Los Banos, Pagsanjan, Alaminos, Hidden Valley Spring, 26. III.-4.IV.1978, T.Tano(9♂); Alaminos, Hidden Valley Spring, Pagsanjan, St.Domingo, 6-17.VIII.1978, H.Kurokawa(3♂), T.Murota(10♂); Naguilian, Bontoc (850 m), 27-30.XII.1979, T.Murota(14♂).

2 ♂, Cebu: Cantabaco and Mactan Is., 28, 30.III.1979, H.Kurokawa(1♂), T. Tano(1♂).

1 ♂, Negros: Taytay beach, 4.IV.1979, T.Tano.

Hereupon it becomes necessary for practical use to find out the external difference corresponding to the genitalial difference between the two species, because the genitalia are usually not exposed. It was easily discovered, namely, fore femur seen from posterior side is in docilis deeply excavated beneath (Figs. 36, 37, 38), while in subtessellatus not excavated (Figs. 39, 40). In both species there are some individual variations as given in the figures, but the two sets of variations are not graded to each other and they can easily be distinguished one from the other. Further, clypeus gives an other clue. In subtessellatus apical margin of median lobe is greater in width than the



Figs. 36-40. Fore femur.
36-38. Liris docilis Smith.
39-40. L. subtessellatus Smith.

distance between its lateral angle and the nearest inner orbit (20 : 13-15), while in docilis both the widths are subequal to each other (20 : 18-20). In other characters, however, there is no definite difference between them, as far as examined and measured by me. There are always some exceptions even when one character is applicable to most of the specimens of one of the species and not to the greater part of the other. For instance: Wing colour, in subtessellatus wings are less yellowish; body size, in subtes. somewhat smaller, 6-9 mm, mostly 7-7.5 mm, in doci. 7-11 mm, mostly 7.5-8.5 mm; apical incision of GS8, in subtes. very weak, frequently complately lacking, in doci. always distinctly triangularly incised.

At any rate, there is no difficulty in separating the two species in the male.

On the other hand, the matter is not so easy in the female. As mentioned earlier, it is presumed that in the female also each of the two species has two colour forms of the hind femur. The colour of the hind femur, is, therefore, of no use to separate the two species. But it is very difficult to separate them by some other characters, because here the genital organs are unhelpful, apical margin of the clypeal median lobe is always much broader than lateral lobe and the legs are similar in form in all specimens.

In order to discover the reliable differences between the two species I reexamined the Formosan representatives wherein the specimens bearing the red hind femur are always subtessellatus and those with black hind femur are always docilis, judging from the distinctions of the males. The results are as follows:

Comparatively broadly applicable differences:

(1) Lateral lobe of clypeus (CLL, here the distance between lateral angle of apical margin of median produced part (CML) and the nearest inner orbit) as against CML is much narrower in subtessellatus than in docilis. This is more marked when compared with half the width of CML - from median incision to lateral angle:

subt.(Formosan)	doci.(Formosan)	doci.(Japanese)
CML(half) : CLL	CML(half) : CLL	CML(half) : CLL
20 (10) : 6.0	20 (10) : 8.0	20 (10) : 8.5
20 (10) : 6.0	20 (10) : 8.5	20 (10) : 9.0
20 (10) : 6.0	20 (10) : 8.0	20 (10) : 8.5
20 (10) : 6.0	20 (10) : 8.5	20 (10) : 8.5
20 (10) : 5.5	20 (10) : 8.0	20 (10) : 8.5
20 (10) : 6.0	20 (10) : 8.0	20 (10) : 8.5

(2) Apical bevel of clypeus smooth and polished in subtessellatus, while in docilis the bevel with transverse series of punctures below, or sparsely punctured in addition.

(3) Disc of median lobe of clypeus with only a weakly raised line in middle, or completely without such in subtessellatus, while in docilis the disc with a distinct raised line apically in middle.

(4) Antennal rhinaria are present usually on A6-11 in subtessellatus, sometimes on 6 indistinct; while they are on A8-11 as a rule in docilis, but sometimes on A7 and very rarely on A6 also present. Rhinaria are in both species very small, on A6, 7 or 8 especially small, rather shallow, flat-bottomed-puncture-like and frequently difficult to confirm (mainly from the unsuitable condition of the flagellum — in such a case antennae should be suitably extended by means of the diluted alcohol. When the impression is surely present on A6, therefore, it seems highly probable that the specimen belongs to subtessellatus. Of the 10 sampled Formosan specimens of subtessellatus all have the Rhinaria on A6-11 (but in one very very small on A6), while of the 10 Formosan docilis-specimens sampled out, 2 have the impressions on A8-11, 7 have them on A7-11 and one has them on A6-11, usually the rhinaria are much smaller then in subtessellatus.

Besides the above (5) medio-anterior furrow of mesoscutum is generally deeper and more distinct in subtessellatus than in docilis, and (6) inner-orbital forward divergency is generally stronger in subtessellatus than in docilis. When IODv=10, averaged IODc (at base of clypeus as usual) of 5 sampled subtessellatus =31*(33,30,29,30,31), while in docilis =27.8 (30,28,29,25,27). When IODc is measured at apex in subtessellatus 36.6 (41,36,33,35,38), while in docilis 33.4 (36,34,35,30,32).

Further, relative length and width of antennomeres and tarsomeres, relative width HW:IODv, downward convergency of posterior aspect of propodeum, comparative strength of striae on various parts of propodeum and of the longitudinal ridge on hind tibia etc. were measured and examined, but no distinct difference tendency could be confirmed.

According to the results at least as to the Formosan specimens we can separate subtessellatus from docilis without the aid of the colour of the hind femur, by comparing the clypeus (3 characters), antennal rhinaria and inner orbital divergency. Of these comparatively reliable ones are the ratio of CML:CLL and the distribution of antennal rhinaria. So I measured and observed the clypeus and antenna of the Philippine female

specimens of subtessellatus-docilis complex. A part of the results is given in Table 3.

Table 3. Results of tests in the Philippine specimens (♀)

Hindfemur	Loco	CML	h:CLL	Bevel	M.Carina	Rhinaria	Concl.
Red	Min.	10	6.5	S-t	S-t	7-11	S
"	Min.	10	7.5	D-t	S-t	7-11	D
"	Luz.	10	8.0	D-t	S-t	7-11	D
"	Luz.	10	6.0	D-t	D-t	6-11	S
"	Luz.	10	6.5	S-t	S-t	7-11	S
Black	Min.	10	7.5	D-t	D-t	7-11	D
"	Min.	10	8.0	D-t	S-t	7-11	D
"	Min.	10	8.0	D-t	D-t	7-11	D
"	Min.	10	8.0	D-t	S-t	6-11	D
"	Min.	10	7.5	D-t	S-t	7-11	D
"	Min.	10	7.5	D-t	S-t	8-11	D
"	Min.	10	7.5	D-t	S-t	6-11	? D
"	Luz.	10	6.5	D-t	D-t	7-11	? S
"	Luz.	10	7.5	D-t	D-S-t	7-11	D
"	Luz.	10	8.0	D-t	S-t	7-11	D
"	Luz.	10	6.0	D-t	D-S-t	6-11	S
"	Luz.	10	6.5	S-t	D-S-t	7-11	S
"	Luz.	10	6.0	D-t	D-S-t	6-11	S
"	Neg.	10	7.5	D-t	S-t	6-11	? D
"	Neg.	10	7.5	D-t	D-t	6-11	? D
"	Neg.	10	8.0	D-t	S-t	7-11	D
"	Neg.	10	7.5	D-t	S-t	7-11	D
"	Cebu	10	6.5	D-t	S-t	7-11	S
"	Cebu	10	7.5	D-t	S-t	7-11	D
"	Cebu	10	7.8	D-t	S-t	7-11	D
"	Cebu	10	8.0	D-t	S-t	6-11	D
"	Cebu	10	7.0	S-D-t	S-t	7-11	? D
"	Cebu	10	7.5	S-t	S-t	7-11	D
"	Cebu	10	7.5	D-t	S-t	7-11	D
"	Cebu	10	6.0	D-t	S-t	6-11	S

Remarks. CMLh ... CML(half). Bevel ... Punctation on bevel. M.Carina ... Median carina of clypeus. D-t and S-t ... docilis-type and subtessellatus-type. Conclusion, D ... docilis, S... subtessellatus.

According to the results it becomes obvious that the standard differences obtained from the Taiwanese representatives of the two species can not so clearly be applicable to the Philippine specimens, easpecially the punctuation on clypeal bevel and the strength of median carina of clypeus are quite unapplicable. If stress is placed upon the value of CML:CLL which is the most reliable difference in the Taiwanese specimens, the distribution of the antennal rhinaria comes to be not so important. Further, the ratio of CML:CLL itself is here not so clear-cut as in the Taiwanese. It is rather gradual and to draw a border line at any place is rather difficult. The question mark attached to the species symbol in the column of conclusion shows such a case (here the distribution of antennal rhinaria on A6 is also taken into consideration).

The female specimens examined of the two species separated mainly by the ratio of CML:CLL (partly somewhat force):

A. Apparent subtessellatus bearing red hind femur (but the red is considerably varied in extent, sometimes in part only): 10 ♀:

(1) Real subtessellatus: 4 ♀.
2 ♀, Mindanao; 2 ♀, Luzon.

(2) Really docilis: 6 ♀.
3 ♀, Mindanao; 3 ♀, Luzon.

B. Apparent docilis, bearing black hind femur: 82 ♀:

(1) Really subtessellatus: 8 ♀.
1 ♀, Mindanao; 5 ♀, Luzon; 2 ♀, Cebu.
(2) Real docilis: 74 ♀.
23 ♀, Mindanao; 41 ♀, Luzon; 6 ♀, Cebu; 4 ♀, Negros.

Localities and dates:

Luzon: Los Banos, Pagsanjan, Hidden Valley Spring, Baao, Tabaco, 2-19.VIII. 1978. Naguilian near Baguio, 28.III.1978. Bontoc, Asin Spa near Baguio, 29.XII.1979-5.I.1980.
Cebu Argao and Cantabaco, 30-31.III.1979.
Negros Taytay beach, 4-5.IV.1979.
Mindanao Zamboanga, 30.VII.-2.VIII.1980.

Remarks. Both colour forms of the two species are collected irrespective of the season of the year.

On some characters of both species ♀. Clypeus with apical bevel polished, but not completely without puncture, usually with weak and sparse punctures transversely, irregularly arranged across middle, sometimes basal half also bearing sparse fine punctures, but not so distinct and not so close as in rohweri. Furthermore, medio-apical incision much weaker than in this species. Sculpture on dorsum of propodeum considerably variable, most frequently transversely, not strongly, finely and fairly closely rugoso-striate or rugoso-reticulate, but some times striae very weak, only under high magnification observable, nevertheless the surface is always dull, due to very delicate microsculpture. Lateral carinae also variable, sometimes present and sometimes absent except apical ones of posterior aspect which is also varied in length and strength, when the lateral carinae present they are always weak and sometimes complete and sometime incomcomplete. The ground hair of pygidial area always short, silvery or pale brassy, mixed sparsely with obliquely erected hair which is no long, rather weak, not spiniform and whitish, in this respect clearly different from rohweri in which the erect hair thicker and nearly spiniform (Williams' key is perplexing in this regard) and pale brownish or deep brown in colour.

Measurements with same sized specimens of both species.

HW,IODv,A3	= 100,19,12	(docilis black-legged ♂),	= 100,22,13	(subtes. black-legged ♂)
	= 100,20,13	(" red-legged ♂),	= 100,21,13	(" red-legged ♂)
	= 100,18,18	(" black-legged ♀),	= 100,18,18	(" black-legged ♀)
	= 100,18,17	(" red-legged ♀),	= 100,18,17	(" red-legged ♀)
A2,3,4,5	= 7,10,10,10	(" black-legged ♂),	= 7,10,10,11	(" black-legged ♂)
	= 7,10,11,11	(" red-legged ♂),	= 7,10,10,11	(" red-legged ♂)
	= 6,10,10,10	(" black-legged ♀),	= 6,10,10,11	(" black-legged ♀)
	= 6,10,10,10	(" red-legged ♀),	= 6,10,10,10	(" red-legged ♀)
IODv:IODc	= 10:25	(" black-legged ♂),	= 10:23	(" black-legged ♂)
	= 10:24	(" red-legged ♂),	= 10:24	(" red-legged ♂)
	= 10:28	(" black-legged ♀),	= 10:27	(" black-legged ♀)
	= 10:27	(" red-legged ♀),	= 10:28	(" red-legged ♀)

Antennal placoids in both forms of the two species are always on A4-13 present and on 13 not reaching apex.

16. LIRIS (LEPTOLARRA) ROHWERI (WILLIAMS, 1928)

Notogonidea rohweri Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 78, 1928 (3 ♀ 2 ♂, Philippines, 1 ♂, Singapore, figs.).
Liris (Dociliris) rohweri: Tsuneki, Etizenia, 20: 31, 1967; Ibid., 55: 4, 1971 (22 ♀, 40 ♂; 5 ♂, Formosa, figs.).
Liris (Dociliris) formosana Tsuneki, Life Study, 17 (3-4): 113, 1973 (n. st. of Formosan form, but in reality a ssp.).
Liris (Dociliris) formosana: Tsuneki, Ann. Hist. Nat. Mus. Nat. Hung., 69: 268, 1977
Liris (Leptolarra) rohweri: Bohart & Menke, World Sphecid., p. 247, 1976 (listed).
Liris (Leptolarra) rohweri formosanus: Tsuneki, SPJHA, 23: 27, 1982.

Specimens examined: 7 ♀ 10 ♂: 3 ♀ 2 ♂, Mindanao: 1 ♀, North Cotabato, Mt. Apo, 700-1000 m, 7-9.VIII.1980, T.Tano; 1 ♀ 1 ♂, Mt. Apo, 1000-1500 m, 9.VIII.1980, T.Murota; 1 ♀ 1 ♂, Bukidnon, Malaybalay, 800 m, 13.VIII.1980, T.Murota.
4 ♀ 8 ♂, Luzon: 1 ♂, Prov. Laguna, Los Banos, Botanical Garden, 2-5.VIII.1978,

T.Murota; 1 ♂, same loco, Mt. Makiling, valley, 29.III.1978, T.Tano; 1 ♀, Pagsanjan, river side, 2.IV.1978, T.Tano; 1 ♀, Mountain Prov., near Baguio, 1000 m, 31.XII.1979, T.Murota; 2 ♀ 4 ♂, Baguio City, Mines View Park, 1500 m, 1.I.1980, T.Murota; 2 ♂, A-sin Spa, 16 km from Baguio, 2.I.1980, T.Murota.

Remarks. This species is very closely allied to L. docilis Smith bearing black hind femur, but can be distinguished therefrom by the following distinctions:

Apical bevel of clypeus more distinctly punctured on its basal half (♀♂), it medio-apical incision deeper (♀), IODv relatively smaller (♀), inner orbits more strongly divergent below (♀♂), lateral carinae of propodeal dorsum more distinct (♀♂), erect hairs of pygidium comparatively stronger, thicker, nearly spiniform, but not very long and brownish in colour (♀), wings less yellowish and more darkened (♀♂) and punctures on mesoscutum slightly larger, sparser, with PIS crossed with microstriae and dull deep black, not glossy as in docilis.

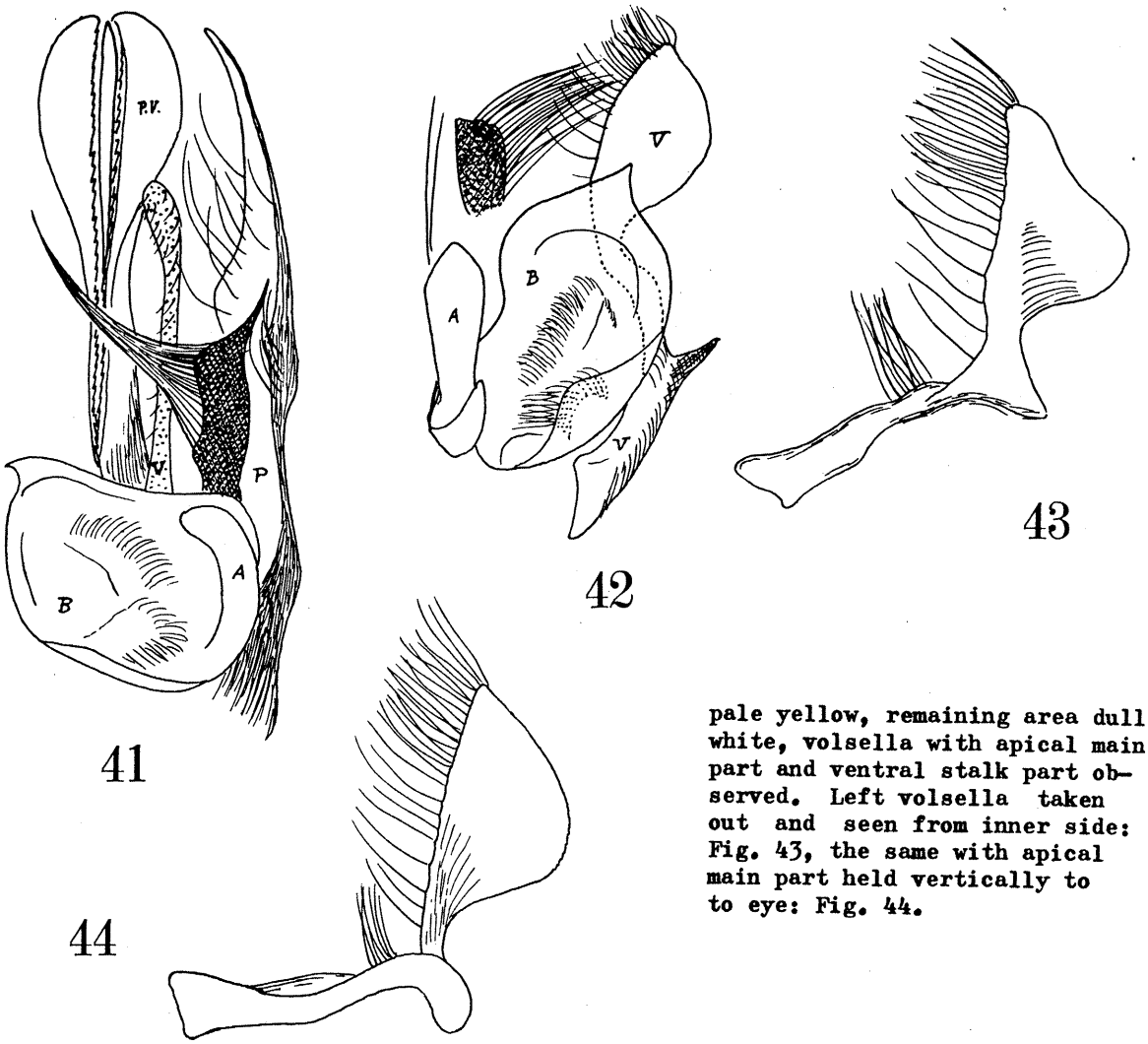
It has been clarified by the direct comparison of the specimens that the Formosan form which was first identified with the present species and later separated from this was only a local race, differing in that lateral carinae and sculpture of propodeum are much stronger and distinct. As to the lateral carinae nothing was said by Williams and we thought that they are lacking in rohweri. In reality the carinae are present, in ♀ strong and distinct (in ♂ less strong), though often intermittent, and useful to separate it from docilis.

On some characters. ♀ 11-13 mm, ♂ 7.5-10 mm. HW:IODv=100:16(♀), 100:18(♂). IODv: A3=10:11.5(♀), 10:8(♂). A2,3,4,5=5,10,9.5,10(♀), 6,10,11,11(♂). IODv:IODc=10:30(♀), 10:27(♂). In ♀ antennal rhinaria on A7-11 present, small (but much larger than in docilis), oval in form, located near middle beneath of each joint, on 7 about 1/10, on 8 about 1/6, on 9 about 1/5 and on 10-11 about 1/5 - 2/5 of each joint. In ♂ antennal placoids are always on A4-13, on 13 not reaching apex, on others filling each span.

♀. Dorsum of propodeum medianly carinate, carina sometimes reaching near apex, sometimes ending at about 2/3 from base, never reaching apical margin, surface transversely, feebly, very finely and closely striate, striae under oblique light well visible and slightly stronger at medial area (crossing medial carina) and sparser and much stronger at lateral areas, at verge to posterior aspect always one or 2-3 transverse, strong carinae present, posterior aspect medianly longitudinally excavated as usual, the form and size of the excavation quite variable, but always with a distinctly shining bottom line in middle, sometimes at posterior area, at above gastral socket rim, divergently excavated again (as particularly mentioned by Williams), but such is not always constant; sometimes upper marginal carina interrupted in middle by the furrow and curved down along it, forming a downward converging carinae as in robustus (but always much smaller). Sculpture of posterior aspect generally similar to dorsum, but frequenly more strongly and sparsely so, always at dorso-lateral areas and along lateral carinae the transverse striae are stronger and coarser. Lateral carinae of propodeum always present, but usually incomplete, on dorsal aspect alway intermittent and weak, usually confined to posterior half or third only, on posterior aspect also usually intermittent and weak except apical part, only rarely complete, but not strong. In this respect markedly different from the Formosan representatives in which the carinae always complete and strong on posterior aspect and very frequently complete on dorsal side also, and at least intermittently reaching near the propodeal spiracles.

♂. Punctures on mesoscutum slightly larger and sparser than in ♀ and also than in docilis ♂, with PIS delicately microstriate across and the surface somewhat rough and more opaque; sculpture on propodeum generally similar to ♀ in pattern, but much stronger and coarser, surface appearing transversely coarsely rugoso-striate, with interspaces minutely, irregularly reticulate and dull and opaque, rugae somewhat stronger medianly and markedly so laterally, posterior aspect with median furrow variable as in ♀, surface somewhat obliquely, more strongly and coarsely striate or rugoso-striate than on dorsum, with interspaces minutely rugulose, but surface somewhat shining; lateral carinae on posterior aspect always complete and on dorsal aspect also complete at least on posterior portion, usually weaker anteriorly, only rarely reaching spiracle.

The form of clypeus and deformation of fore and hind femora are as in the Formosan specimens (cf. Tsuneki, 1967, Figs. 76-80), sternite 8 and genitalia also similar (cf. ditto, Figs. 81-87). Here some supplemental ones are given. Right half of genitalia seen from beneath: Fig. 41, paramere with a well chitinized black supporter of long hairs thinly produced from base beneath, basiparamere with two lamellate appendages, outer one (A) slender and curved, inner one (B) thin basin-like, with apex pointed and with two short rows of yellowish hairs within, volsella (V) appears stick-like and incrassate apically. P ... paramere, P.V. ... penis valve. The basal appendages of left paramere seen vertically: Fig. 42, inner one (A) at apical marginal area translucent



pale yellow, remaining area dull white, volsella with apical main part and ventral stalk part observed. Left volsella taken out and seen from inner side: Fig. 43, the same with apical main part held vertically to to eye: Fig. 44.

17. LIRIS (LEPTOLARRA) SILVICOLA WILLIAMS, 1928

Notogonidea silvicola Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 76, 1928 (♀ - holotype -, 7 ♀, Luzon, Basilan, Surigao, Mindanao and North Borneo, nec ♂)
Notogonidea mindanaoensis Williams, Ibid., p. 79, 1928 (♀ ♂, Mindanao, North Borneo; 5 ♂, Luzon - Mt. Makiling -, Mindoro, N.Borneo; 1 ♂, Mindanao).
Liris (Leptolarra) mindanao Menke, in Bohart & Menke, World Sphecid., p. 246, 1976 (nom. nov. for Notogonidea (now Liris) mindanaoensis Williams, 1928, nec Liris mindanaoensis Williams, 1928).
Liris (Dociliris) silvicola: Tsuneki, Steenstrupia, 4: 60, 1976 (1 ♀, Balabac).

Specimens examined: 2 ♀ 3 ♂ Luzon and 1 ♂ Mindanao:
1 ♀ 1 ♂, Luzon, Baguio City, Mines View Park, 26.III.1978, T.Tano(♀) and T.Murota (♂); 2 ♂, same locality, 1.I.1980, T.Murota; 1 ♀, Luzon, Mountain Prov., Bontoc, 850 m, 29-30.XII.1979, T.Murota. 1 ♂, Mindanao, North Cotabato, Mt. Apo, 1000-1500 m, 9. VIII.1980, C.Nozaka.

As given in the above list of references I identified Notogonidea mindanaoensis Williams (now Liris mindanao Menke) with Liris silvicola Williams, ♀ and separated ♂ of silvicola from its ♀. The reasons for this are as follows:
(1) The characters that were pointed out by Williams as different between the two species concerned here are all variable ones and fall within the tolerable range of variation of a species, namely, body size (11.5 or more : 14-15 mm - see below), relative length of A3 and A4 (A4 a little longer than A3 : A3 and A4 subequal), sculpture on

posterior aspect of propodeum, colour of semi-recumbent long bristles of pygidium (yellow : dark - see below), pile of body (golden : silvery).

(2) As above given in the list of material examined, a female specimen of silvicola and a male specimen of mindanaoensis are captured at the same place and on the same day and taking into account of the sexual distinctions they are they are very similar in characters to each other.

(3) As to silvicola Williams, ♂, it is strange that the male alone has long hair on head and thorax above and its body size is too small (8.5 mm).

Remarks. The characters pointed out by Williams in the specimens examined here:

The female specimens of silvicola observed are 11.5 and 12.5 mm in length (gaster not fully stretched, but rather closer to mindanaoensis). The male specimens that are newly combined with silvicola and that have the genitalia structured as in mindanaoensis are 9.5, 9.5, 10.0 and 11.5 mm respectively.

The body pile of all the Luzon specimens (♀ ♂) is silvery, while in a Mindanao male specimen pile of face and clypeus brassy and on temples, thorax-complex and gaster silvery, but all the male specimens are quite identical not only in external characters but in the structure of the 8th sternite and the genital organs also.

In the female specimens A3:A4=10:9.5 and 10:10 (the values are strictly slightly variable according to various condition).

It is the usual fact that medial furrow and transverse carinae of posterior aspect of propodeum are considerably variable within a same species in this genus.

Colour of half erected bristles of pygidium is considerably variable under different light condition. In one of the specimens observed the bristles are brown, in the other pale brown in dorsal view, but in lateral view, except brown dorsal margin, they are broadly pale yellow. The ground appressed hair comparatively long and thick, in the larger specimen yellow-golden, but in some direction appearing brown, dark brown or nearly black, in smaller specimen cuppery and changeable to dark brown - nearly black.

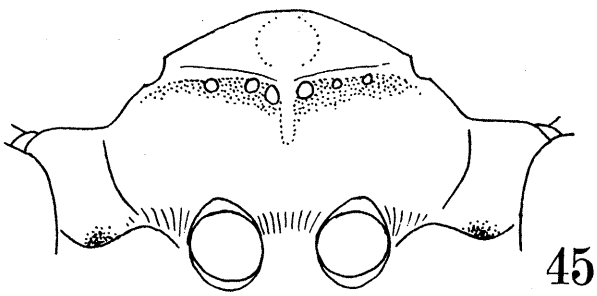
Measurements.

In ♀: HW:IODv = 100:15, =100:14.5. IODv,IODc,A3=10,34,14, =10,35,15.
A2,3,4,5 = 5.5(4),10,10,10. = 5.5(4),10,9.5,9.5.

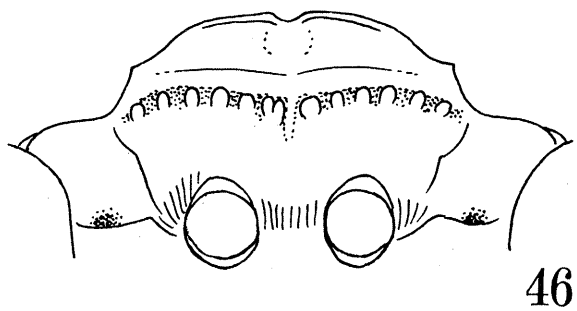
In ♂: HW:IODv = 100:19, 100:20, 100:19.5, 100:20.
IODv,IODc,A3=10,26.5,8, 10,25,7, 10,25,8, 10,25,8.
A2,3,4,5 = 5.5(4.5),10,10,11, 6(4),10,10,10, 6(4.5),10,10,10,
6.0(4.5),10,10,10.

A2 ... full length of black chitinized area, within parenthesis value from basal constriction till apex.

Clypeus. ♂: Fig. 45, apical margin and bevel similar in form to that illustrated by Williams (Fig. 66) as N. mindanaoensis ♂, but lateral angles more distinctly produced, with a minute emargination there, bevel at median area narrowly flattened or slightly concave, medio-apical margin in one specimen very minutely and feebly emarginate, in



45



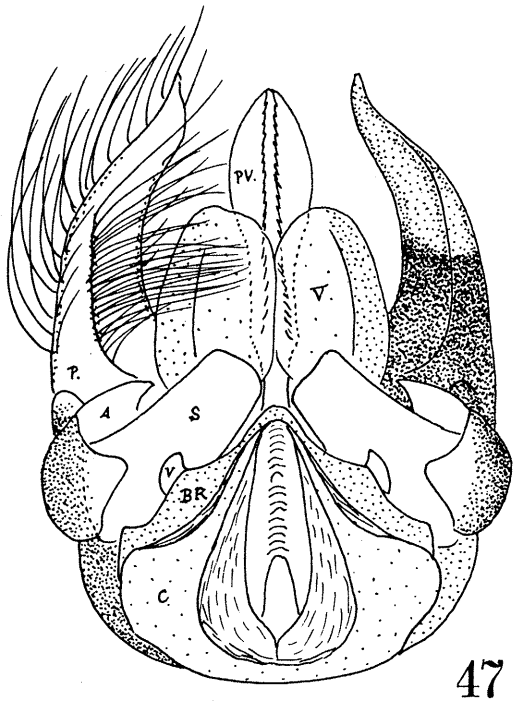
46

Figs. 45(♂), 46(♀). Liris (Leptolarra) silvicola Williams

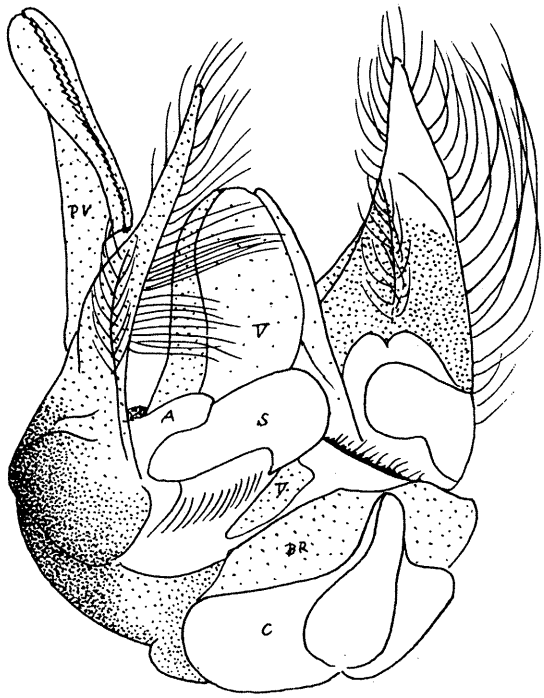
all others entire. ♀: Fig. 46, median area of bevel broadly flattened as in ♂ and medio-apical margin minutely shallowly incised, the margin on each side of the incision finely raised or reflected into a weak carina, surface of bevel shining and scattered sparsely with very fine punctures.

Mesothorax. Mesoscutum in ♀ micropunctate-reticulate, but under high magnification punctures slightly larger than in docilis ♀, about 1.5 times as large as those in the latter and much deeper, but without microstriae (impressed lines) crossing linear PIS, in ♂ similar, but punctures distinctly larger than in ♀. Anterior structure of mesoscutum (♀ ♂) different from that of docilis, more acutely and more highly raised (hence top of pronotal collar much below level of mesoscutum) and antero-lateral areas

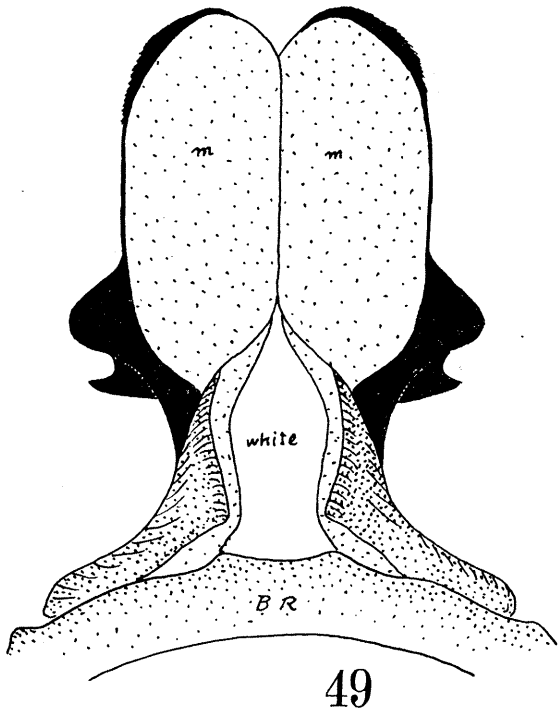
more strongly, roundly produced upwards. Punctures on epimeral area of mesopleuron in ♀ fine, sparse, rounded, very shallow and quite indistinct, surface irregularly, not strongly rugulose, rugulae stronger upwards scrobal furrow which is shallow and broad, irregularly, sparsely foveolate(strictly anterior part of the furrow is heavily disturbed by rugulae and foveolate structure is rather indistinct), below the furrow episternum finely, rather closely punctured, punctures partly contiguous in irregular directions and mixed sparsely with some larger punctures, PIS fairly strongly microcoriaceous, punctures smaller and closer towards metapleuron and indistinct, and replaced



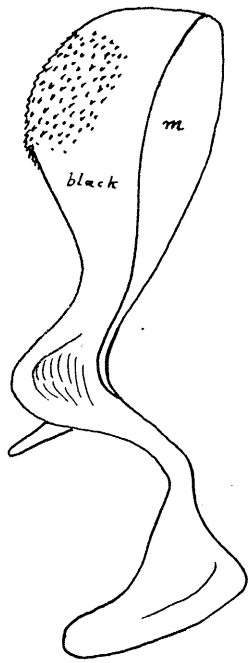
47



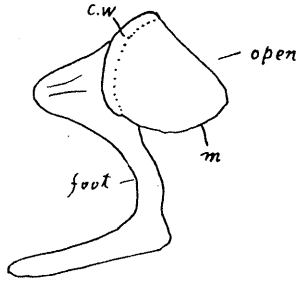
48



49



50



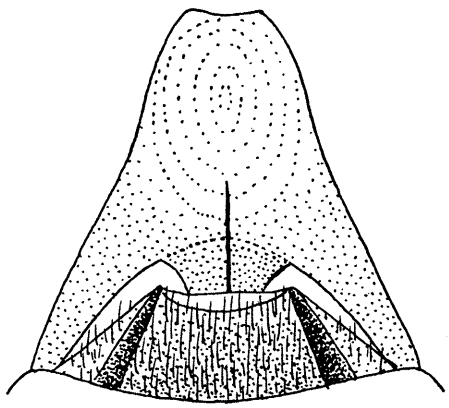
51

Figs. 46–51. Genitalia of Liris (Leptolarra) silvicola W., ♂ (n. comb.)

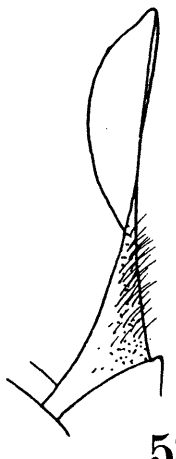
with rugulae towards scrobal furrow; in larger specimen punctured area broader, while in smaller one rugosed area broader, but both similar in fundamental pattern. In ♂, epimeral area somewhat coarsely and irregularly rugoso-reticulate, below scrobal furrow rugae partly transversely stronger, but on the area much below rugae weaker and similar in strength, mixed with large, deep and sparse punctures, with PIS microcoriaceous and irregularly rugulose.

Propodeum. Lateral carinae not well developed (♀ ♂), except apical part of posterior aspect, but usually at sides of posterior portion of dorsum more or less developed, connected with transverse carinae, the strength and thoroughness (frequently intermittent) considerably variable. Sculpture of propodeum as given excellently by the original author.

Genitalia of ♂: Ventral view: Fig. 47, P = paramere, V = volsella, P.V. = penis valve, C = cardo, BR = special basal ring, S = ship-shaped appendage of basiparamere, A = appendage of S. Oblique lateral view (from left side): Fig. 48, in this instance P.V. strongly reflected). Volsella very characteristic, the pair seen from beneath: Fig. 49, left one seen from left side: Fig. 50, seen from apex: Fig. 51 (schematic). Main part is an elongate pouch, with inner side open, ventral side is a translucent membrane, ashy grey in colour, with surface microcoriaceous (m in Figs. 49, 50 and 51) and outer to dorside is a well chitinized blackish plate, partly densely spinulose (Fig. 48 and cw in Fig. 51), foot of volsella extended ventrally curving, then turn outward behind special basal ring (BR in Fig. 51, seen from apex). The wall at roof of main part of volsella is thin and likely to be bent or folded, when ventral membraneous wall is bent inwards volsella becomes different in form seen from beneath. Basiparamere with a ship-shaped membraneous appendage as usual in this genus which is provided at base on dorsal side with a small additional appendage (A) that is extended backwards, thickening and darkening and connected with the ventral median ridge of paramere.



52



53

Sternite 8 and tergite 7 seen from above (after genitalia is removed): Fig. 52. Sternite 8 with apex gently emarginate and with apical part markedly roundly swollen, seen from left side: Fig. 53. Tergite 7 with an incomplete pygidial area, margined on both sides with thickly raised blunt carinae, but apical margin free, thin membraneous and basally thickened to normal sclerite which is fairly closely covered with hair.

Reexamination of type series of Notogonidea mindanaoensis Williams. See addenda.

18. LIRIS (LEPTOLARRA) MAKILING SP. NOV.

Notogonidea silvicola Williams, ♂ (nec ♀), Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 76 (1 ♂, Mt. Makiling).

As given in the preceding pages Liris (Leptolarra) mindanao Menke (= Notogonidea mindanaoensis Williams) is synonymized with Liris silvicola Williams and its male is combined newly with Liris silvicola ♀, the previous silvicola ♂ has become nameless, so to it the new name was given as above.

♀, unknown.

Holotype: ♂, the specimen designated by Williams as allotype of Notogonidea silvicola Williams, 1928 (Mt. Makiling, Los Banos, Prov. Laguna, Luzon, C. F. Baker leg.).

Remarks. See addenda.

19. LIRIS (LEPTOLARRA) FESTINANS (SMITH, 1859)

Larrada festinans Smith, J. Proc. Linn. Soc. London, Zool., 3: 17, 1859 (♀ ♂, Celebes).
Notogonia manilae Ashmead, 1904, p. 130; Notogonidea manilae: Williams, 1928, p. 75; ——: Swezey. 1942, p. 184; Motes manilae: Yasumatsu, 1941, p. 44; ——: Krombein, 1949, p. 395.
Notogonidea williamsi Rohwer, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 14: 9. 1919.
Notogonia japonica Kohl, 1884, p. 357; —— Japanese authors.
Notogonia praetermissa Richards, 1928, p. 361; Liris praetermissa: Beaumont, 1961, p. 236; Liris japonica praetermissa: Tsuneki, 1964, p. 221.
Liiis (Nigliris) japonica: Tsuneki, Etizenia, 20: 34, 1967 (Formosa); —— Japanese authors.
Liris (Leptolarra) festinans: Bohart & Menke, World Sphecid., p. 245, 1976.
Liris (Leptolarra) festinans: Tsuneki, SPJHA, 19: 19, 1982 (

Specimens examined: 7 ♀ 1 ♂, Luzon: Prov. Laguna, Albay, Launion and Baguio City, III, IV, VIII. 1978, T.Tano and T.Murota. 3 ♀ 1 ♂, Negros: Taytay beach and Mambucal, 2-5.IV.1979, C.Nozaka & H.Kurokawa. 9 ♀ 5 ♂, Cebu: Argao, Danao, Cantabaco, 29-31.III. 1979, C.Nozaka and H.Kurokawa. 1 ♂, Mindanao: Bucidnon, Malaybalay, 700 m, 12.VIII.1980 C.Nozaka.

Remarks. As to detailed character and variation of this species see Tsuneki, 1967 and 1982.

The specimens of the Philippines examined are small in body size, measuring ♀ 6.0-7.5 mm, mostly 7 mm or so and ♂ 5.0-6.0 mm, distinctly smaller than in ssp. japonica K. State of hair on gaster beneath is all close to type 3 of my 1967 paper (somewhat long curved pubescence on sternites 3-6), but mixed with a few long stiff hairs, strictly, therefore, it belongs to type 1. Antennal placoids in ♂ on A6-9 present, on 6-8 in full length of each joint, but on A9 usually not reaching apex, only rarely reaching. Antennal rhinaria in ♀ on A6-12 present in all the specimens observed, oval in form, less than half, but more than a third the length of each joint, but on A6 slightly smaller. In general comparatively larger than usual in this sex.

Measurements: HW:IODv=100:20(♀), =100:24(♂). IODv,IODc,A2,A3=10,23,5,7(♀); =10, 22,4,7(♂). A3,4,5=10,11,11(♀); =10,11,11(♂). A3=AW×2.2(♀), =AW×2.1(♂).

20. LIRIS (LEPTOLARRA) ALBOPILOSUS TSUNEKI, 1967

Liris (Nigliris) albopilosa Tsuneki, Etizenia, 20: 38, 1967 (♀ ♂, Formosa); —— Japanese authors, 1971-1977 (Formosa).
Liris (Leptolarra) albopilosa Bohart & Menke, World Sphecid., p. 244, 1976 (listed).

Specimens examined: 3 ♀ 4 ♂, Luzon: Prov. La Union, St. Fernando, Naguilian, 27-28.III.1978, T.Murota, T.Tano; Mountain Prov., Bontoc, 850 m, 29-30.XII.1979, T.Murota.

Remarks. This is the first record of this species from the locality other than Formosa. In the Philippine species, however, no particular local character is observed. The antennal rhinaria in ♀ are on A6-11 present, on 6 small, oval in form, about a fourth the length of the joint, on the rest very large in this sex, filling nearly 4/5 length of each joint, rounded at both ends and strictly largest on A10 and slightly smaller gradually towards base and apex. In ♂ also on A6-11 present usually, but sometimes on 6 lacking and on 12 present, on 6 and 12 when present markedly smaller than others, sometimes like a minute flat-bottomed puncture, others similar in form and size to those of ♀, namely rhinaria and not placoid in my sense. This is quite exceptional in the male, usually in this sex the impression fills the ventro-posterior side of the segment from base till apex (not rounded at both ends), with surface smooth and glabrous.

As to genitalia (♂), sternite 8 (♂), pygidium (♀) and clypeus (♀ ♂) see Figs. 109-120 of my 1967 paper on the Formosan Larrinae.

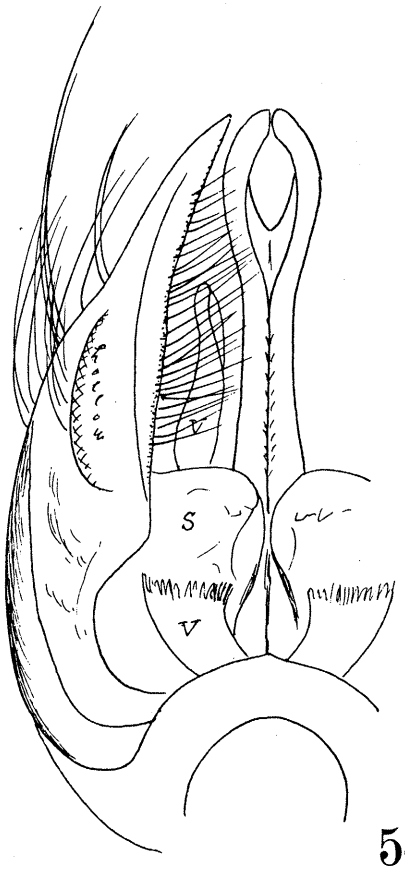
Measurements: HW:IODv=100:21(♀), =100:25(♂). IODv,IODc,A2,A3=10,23,5,7(♀), =10, 21,4,5(♂). A3,4,5=10,11,12(♀), =10,10.5,11(♂). A3=AW×2(♀), =AW×1.7(♂).

21. LIRIS (LEPTOLARRA) BAKERI (WILLIAMS, 1928)

Notogonidea bakeri Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 74, 1928 (10 ♀ 16 ♂, Philippines: Samar, Negros, Luzon; figs. of male antenna, genitalia, GS8).

Liris (Leptolarra) bakeri: Bohart & Menke, World Sphecid., p. 244, 1976 (listed).
Liris (Leptolarra) bakeri: Tsuneki, SPJHA, 19: 20, 1982 (♂, Bismarck Arch., suppl. descr. figs. of genitalia, penis valve and volsella).

Specimens examined: 4 ♀ 6 ♂: 2 ♀ 5 ♂, Luzon; 2 ♀ 1 ♂, Negros.
1 ♂, Prov. Laguna, Los Banos, 2-5.VIII.1978, T.Murota; 1 ♂, Pagsanjan, 7-9.VIII.1978, H.Kurokawa; 1 ♀ 1 ♂, Prov. Camarinessur, lake side of Bato, 16.VIII.1978, T.Murota; 1 ♀, same loco, C.Nozaka; 2 ♂, Prov. La Union, Naguilian, 4.I.1980, T.Murota; 2 ♀, Negros, Mambucal, 2-3.IV.1979, H.Kurokawa; 1 ♂, Taytay beach, 4-5.IV.1979, T.Tano.



54

Remarks. The specimens well agree in characters with the original description of this species and also with the supplement given by me on a male specimen from the Bismarck Archipelago. It belongs to nigricans-group, having raised pronotum, unmodified fore and hind femora and rather coarsely punctured mesoscutum.

Length of the specimens: ♀ 8-10 mm, ♂ 6.5-7.5 mm. Hair on head and thorax-complex silvery, dense and appressed, in oblique light strongly shining, on lateral and medial furrowed areas of mesoscutum divergently outcurved, on dorsum of propodeum at base normally directed posteriorly, but on the remaining areas hair is reversely directed forwards. Sericeous pile bands at apices of GT1-4 present, but the rest of dorsal side also covered with delicate whitish pubescence and in some light partly glittering as in the bands.

Measurements with ♀ and ♂ of one each of the Luzon and Negros specimens:
HW:IODv=100:25, =100:25 (♀); =100:28, =100:28.5 (♂). IODv,IODc,A2,A3=10,24,4.3,5.8, =10,20,4.2,5.8 (♀); =10,19,3.5,4.2, =10,18,3.3,4 (♂). A3,4,5=10,10,10.5, =10,10,10.5 (♀) =10,10,9.5, =10,10,10 (♂). A3=AW×2.0, =AW×2.1 (♀), =AW×1.4, =AW×1.4.

In ♀ antennal rhinaria on A7-11, oval in form, on 7 smallest, located about middle beneath and about 1/5 the length of the joint, thence gradually larger apically, on A8 less than half (1/3 - 2/5) the segment length, on A9 more than half (1/2 -3/5), on A10 about 5/7 and on 11 about 3/4 the length of segment, leaving only a narrow space at base and apex, elliptic in form, about twice as long as wide. As to length of segments A6 is longest and by degrees slightly shorter apically, relative length of A3,7,8,11,12=10,11,10,8,8. In ♂ placoids are on A6-12 present, each filling inner half of the segment.

Genitalia of male are of course similar to those of the Bismarck specimen (Fig. 23 of my 1982 paper above listed). As the places of fringes of hair on the paramere of the Bismarck specimen is inaccurate, the left paramere, volsella and penis valve of the Philippine specimen are given here again (Fig. 54; V ... volsella, S ... enlarged expansion of inner wall of basiparamere).

22. LIRIS (LEPTOLARRA) LIGULATUS (WILLIAMS, 1928)

Notogonidea ligulata Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 75, 1928 (6 ♂, Mindanao, Palawan; figs. of clypeus, antenna, genitalia and GS8).
Liris (Leptolarra) ligulata: Bohart & Menke, World Sphecid., p. 246, 1976 (listed).

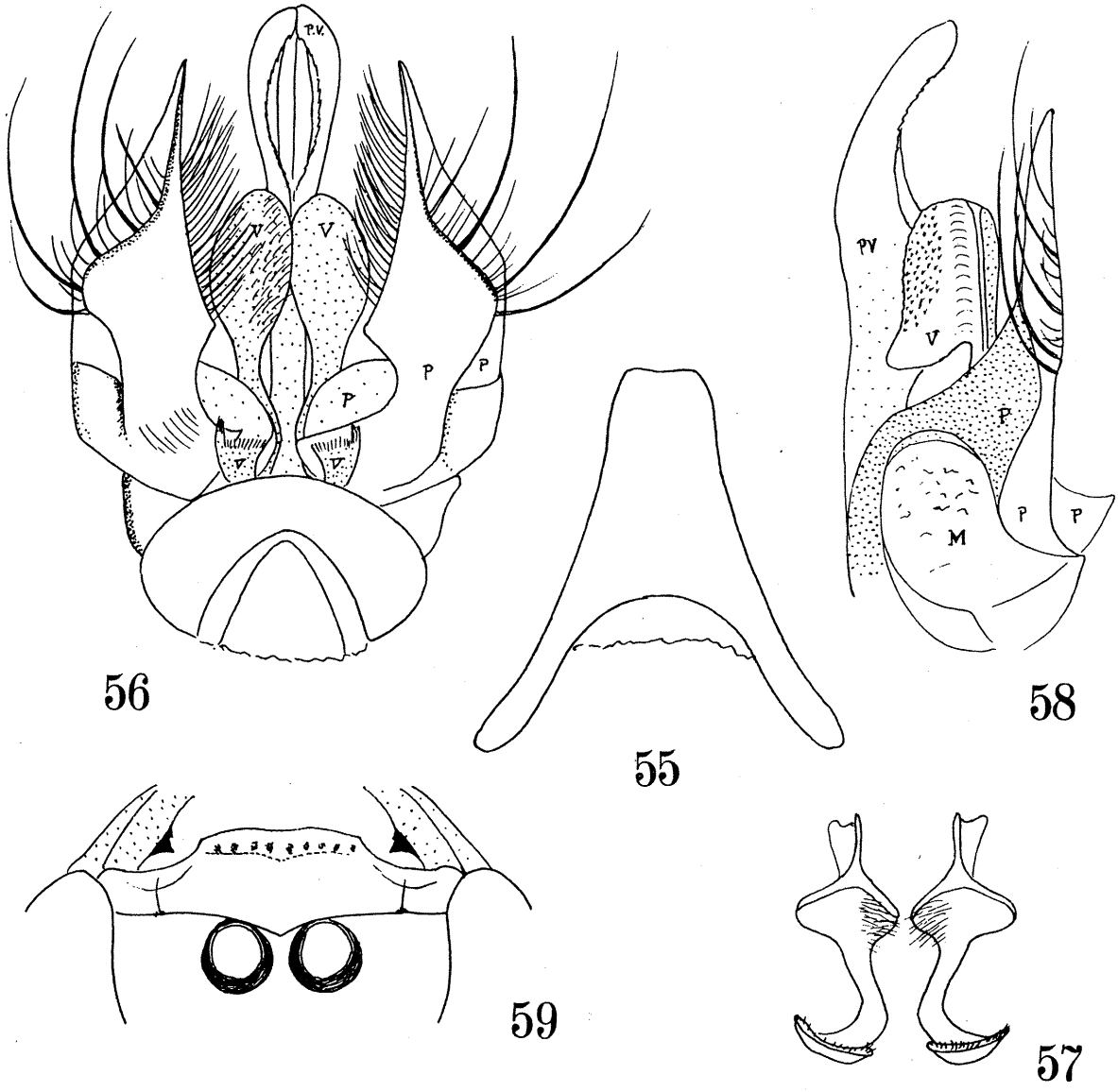
Specimens examined: 1 ♂, Mindanao, Cagayan de Oro, Opal beach, 4.VIII.1980, T.Tano; 1 ♂, Negros, Taytay beach, 4-5.IV.1979, C.Nozaka.

Remarks. Williams' description of this species is rather simple, but he gives figures of genitalia and the 8th sternite of the gaster. Although the former is rough and of little use for the detailed comparative study, it gives general pattern of the struc-

ture. Furthermore, his explanation, "spatuliform sagittae (= volsella, in his case) well armed with stout, very short spinules", is useful for identifying the species.

The specimens before me (♂♂) differ from his description in that the sericeous white bands on gaster are not 4, but 3, namely on GT1-3 and GS8 is less strongly incised at apex, yet its general form is well consistent with his figure and the general appearance of the genitalia is also similar, bearing spatuliform volsella, and so the specimens are identified with ligulata, taking the differences as variations.

This species closely resembles L. festinans, not only in the general group characters, but also in the relative length of antennal segments, but easily separable from



Figs. 55-59. Liris ligulatus (Williams), ♂.

it by the large oblong placoids of antennal segments filling whole the posterior side of A6-11. Further, apical margin of clypeus is not medianly produced as in festinans.

Measurements: Length 6.5 mm. HW:IODv=100:24. IODv,IODc,A2,A3=10,21,3.7,5.5. A3,4,5=10,10,10. A3=AW×1.8. Placoids on A6-11, in full length of each segment.

Sericeous white bands are on GT1-3 present, GS3-6 are densely covered with curved greyish brown pubescence, on GS3 mixed sparsely with a few long soft greyish hair, the curved whitish pubescence under whitish background sppears black.

GS8: Fig. 55. Genitalia very characteristic, seen from beneath: Fig. 56, paramere

(P) at apical part folded, including a somewhat compressed pouch-like empty space between the layers, ventral one of which carries long strong curved hairs on its outer margin and also a fringe of long hair at its inner margin, basiparamere also consisted of two layers on inner side, dorsal rounded one and ventral triangular one, under natural condition both are closely folded; volsella in ventral view with apical part certainly spatuliform (Fig. 56, V), but seen from apical side it consists of three layers radiating (Fig. 57), dorsal enlarged part seen from left side: V in Fig. 58, volsella at its foot extended ventrally and behind basal ring flatly raised and fringed with hair on top, as usually the case in this group (V in Fig. 56 and lower end of Fig. 57). Genitalia seen from left side: Fig. 58, M is a not chitinized, membraneous white area, PV ... Penis valve, dorsal lobe of volsella with dorso-apical part of outer side closely covered with spinules. Williams says as if volsella is armed with spinules on ventral surface. In my specimens, however, the spatuliform ventral surface is not spinulose, but apparently granulate and its inner half is covered with short half-appressed pubescence (Fig. 57, apical view).

Hair on thorax-complex moderately long and moderately close, less dense than in bakeri, but on dorsum of propodeum except base similarly directed forwards.

Clypeus: Fig. 59 in the Mindanao specimen, in the Negros one apical margin of median lobe is not emarginate in middle; 2nd tooth on inner margin of mandible very small and indistinct.

Relative length of abscissae of radial vein from short to long: 2,5,3,1,4 in Mindanao specimen (2.5,3,4,7,10 in the right, 2.5,3,3.5,7,10 in the left) and 2,3=5,1,4 (3,4,4,9,12 in the right and 2.5,3,4,9,12 in the left) in the Negros specimen.

23. LIRIS (LEPTOLARRA) ROBUSTUS (WILLIAMS, 1928)

Notogonidea robusta Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 79, 1928 (♀ ♂, Luzon, Mindoro, Negros, Palawan and Mindanao, over 100 ex., figs. of clypeus, propodeum, pygidium - ♀, antenna, genitalia - ♂).
Liris (Notogonidea) robusta: Tsuneki, Etizenia, 4: 10, 1963 (ssp. planata nov., 1 ♀ 1 ♂ Thailand)
Liris (Dociliris) robusta: Tsuneki, Steenstrupia, 4: 62, 1976 (1 ♀, Balabac).
Liris (Leptolarra) robusta: Bohart & Menke, World Sphecid., p. 247, 1976 (listed).
Liris (Leptolarra) robustus: Menke & Bohart, Proc. Ent. Soc. Wash., 81(1): 117, 1979.

Specimens examined: 7 ♀ 12 ♂, Luzon; 1 ♀ 4 ♂, Cebu; 1 ♀ 3 ♂, Mindanao:

Luzon: 3 ♂, Prov. Laguna, Pagsanjan, river beach, 1.IV.1978, T.Tano; 3 ♂, same loco, 7-9.VIII.1978, H.Kurokawa; 1 ♀ 2 ♂, Los Banos, 2-5.VIII.1978, H.Kurokawa; 1 ♀, Alaminos, Hidden Valey Spring, 3-4.IV.1978, T.Tano; 4 ♀ 3 ♂, same, 6.VIII.1978, H.Kurokawa; 1 ♂, Mountain Prov., near Bontoc, 1000 m, 31.XII.1979, T.Murota; 1 ♀, same, 5.I.1980, T.Murota; 1 ♂, Asin Spa, 16 km from Baguio, 5.I.1980, T.Murota.

Cebu: 1 ♀ 3 ♂, Cantabaco, 30.III.1979, C.Nozaka; 1 ♂, same data, H.Kurokawa.

Mindanao: 1 ♀ 3 ♂, North Cotabaco, Mt. Apo, 700-1000 m, 7-9.VIII.1980, T.Tano et H.Kurokawa.

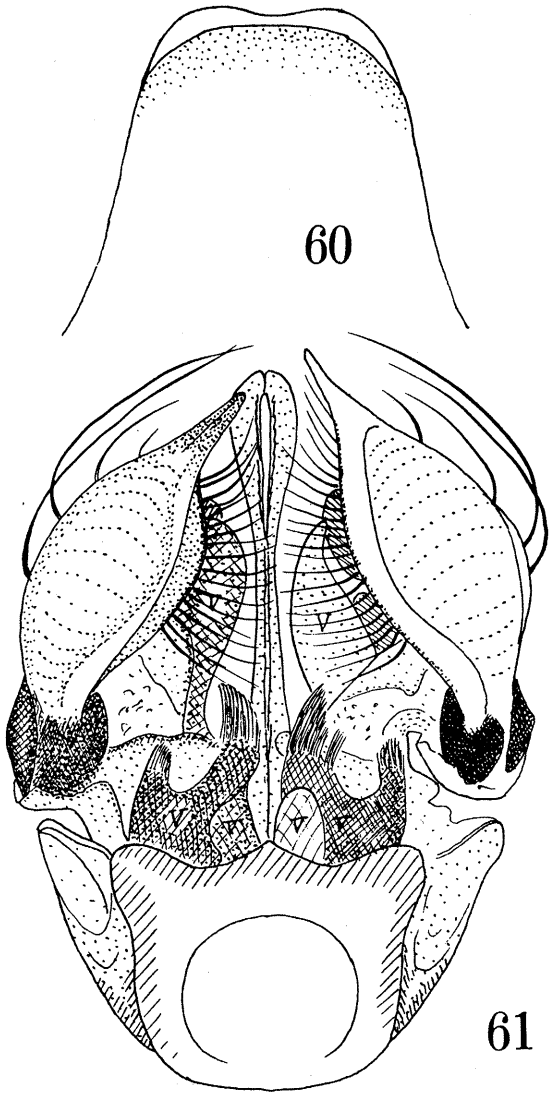
Remarks. In his key to the species in the male Williams (1928) used the relative length of radial vein of fore wing and robusta is assigned to the group having abscissa 5 (transverse radial vein) shorter than 3. However, as usual, relative length of abscissae is considerably variable in this species also and frequently abs. 5 equals to abs. 3 and sometimes abs. 5 lies somewhat oblique to consta. More reliable are the antennal impressions (whether placoids or rhinaria and their distribution) and relative length of A3 and A4 (as to the latter Williams also utilizes in his key).

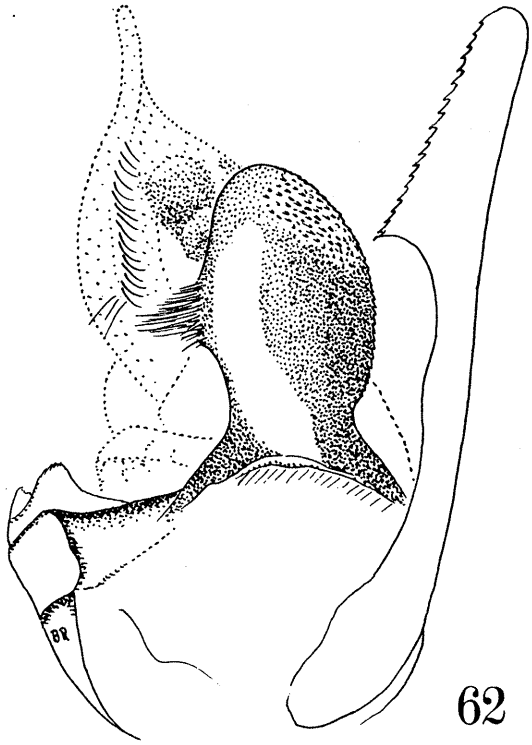
In the present species the impressions in ♂ are rhinaria and not placoid (sense Tsuneki) and they are on A4-13 present beneath, slender and comparatively long, leaving narrow space at base and apex, but in A4 small, round or oval and on A13 also small and located at base. In ♀ Rhinaria are on A5-12 present beneath, broader than in ♂, on A5 oval in form and located slightly beyond middle, on 6-12 gradually longer and longest on A12, spreading over nearly whole the span of the segment, with ends rounded.

Measurements: Length 8.3-10.3 mm (♀), 6.5-7.7 mm (♂). HW:IODv=100:17(♀), =100:20(♂). IODv,IODc,A2,A3=10,28,6.5,9.5(♀), =10,24,4.0,6.5(♂). A3,4,5=10,10.7,11.5(♀), =10,11.5,12.5(♂). A3=AW×2.3(♀), =AW×1.8(♂).

As to pronotal structure and mesoscutal punctation the present species has characters of memnonia (or docilis) group, but as to the femora of the male legs only the fore femur is weakly flattened beneath. Propodeal lateral carinae in ♀ thorough and very dis-

tinct, only rarely weak and very rarely disappeared partly at upper part of posterior aspect; in ♂ usually weaker than in ♀ and frequently intermittent.





Figs. 60–62. Liris (Leptolarra) robustus (Williams), ♂.

Sternite 8 broadly rounded at apex, without incision, but it is fringed with translucent membrane which is distinctly emarginate at apex (Fig. 60). Genitalia seen from beneath: Fig. 61 (V ... volsella), apical part of paramere flattened on ventral side and gently excavated in ship-form, outer margin carries 3–4 thick long bristles and inner margin fringed with a series of moderately long, curved brown hairs; basiparamere without well developed lamellate gutter-shaped plate, volsella of left half and penis valve seen from inside: Fig. 62 (dotted line shows paramere), apical part of volsella flattened and expanded into oviform, with a marked tuft of long hair on ventral margin near middle, on inner and outer sides at dorso-apical area and at dorsal margin closely spinulose; volsella dark brown or black in colour, but along dorsal margin broadly pale yellowish. Penis valve (in Fig. 62, lateral) dark brown.

24. LIRIS (LEPTOLARRA) ROBUSTOIDES (WILLIAMS, 1928)

Notogonidea robustoides Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 77, 1928 (♀ – holotype –, nec ♂ which is presumably the black-femured form of L. subtesselatus sens. Tsuneki).
Liris (Dociliris) lobustoides: Tsuneki, Steenstrupia, 4: 62, 1976 (2 ♀, Balabac).
Liris (Leptolarra) lobustoides: Bohart & Menke, World Sphecid., p. 247, 1976 (listed).

Specimens examined: 1 ♀ 1 ♂, Prov. Laguna, Pagsanjan, Luzon, 7-9.VIII.1978, T.Mu-

rota and H.Kurokawa; 1 ♂, Cebu, Cantabaco, 30.III.1979, H.Kurokawa.

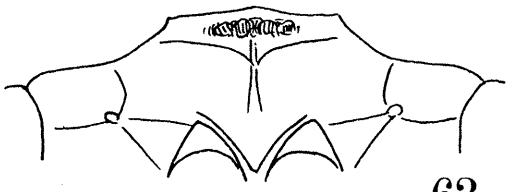
According to his remarks Williams associated his males (10 ♂ from Philippines, Borneo and Singapore) with the females (13 ♀, all from Philippines, chiefly from Luzon) of this species with a query, because the males were proportionally large for the opposite sex.

Certainly, according to my knowledge his males are presumably some forms of the males of L. subtessellatus Smith (sens. Tsuneki, not sens. Williams, his subtessellatus is in reality the complex of true subtessellatus and docilis) and not the true males of robustoides. This is clear from his description of robustoides ♂ and from his remarks on the males from Singapore and Borneo that have the red hind femur. Especially his figure of the male genitalia, though only a rough sketch, considerably well agrees, in the general form (especially in the apical form of paramere) and parameral hair, with the characters of subtessellatus. His explanation and figure of hind femur are also consistent with the femur of some form of subtessellatus.

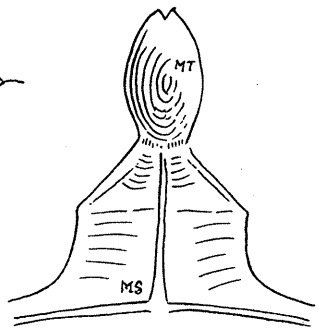
While, the male that was collected with the female of robustoides on the same day and at the same place and is considered by me to be the true male of this species is much more closely allied to robustus ♂ than the Williams' male, not only in the external characters, but also in the structure of the genital organs, just as the female of robustoides is to robustus ♀. The characters of this male are as follows:

♂. Length 6.7 mm (the female is 8.3 mm). Black; mandible light reddish brown, apically slightly darker, mouth parts dark brown, palpi apically paler, wings hyaline, somewhat dusky on apical half, stigma and veins brown; hair silvery, pile bands of gaster on GT1-3, silky white.

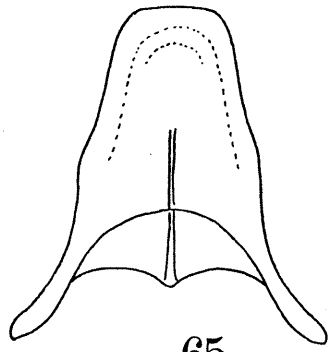
Seen from above HW:HL:IODv=100:50:22, seen in front HW:HL=100:80, IODv:IODc=10:24, clypeus: Fig. 63, medianly narrowly slightly raised, almost without bevel, but apical area (corresponding to usual bevelled area) glabrous and slightly depressed on both sides of medial weak ridge, with surface shining (under high magnification feebly microcoriaceous). IODv,A2,A3=10,4.3,5.5. A3,4,5=10,12,13, A3=AW×1.7 (dorsal view, strongly widened at apical area towards apex) or =AW×1.65 (lateral view), A3 gently, but distinctly excavated on outer side, placoids (not rhinaria) on A4-13, on A13 not reaching apex and apex rounded. Pronotum with median top much below level of mesoscutum and laterally slightly thickened as in ♀, scutellum and postscutellum medianly weakly impressed, on



63

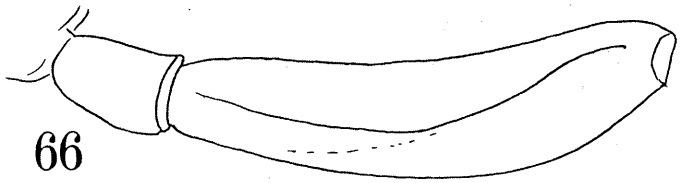


64



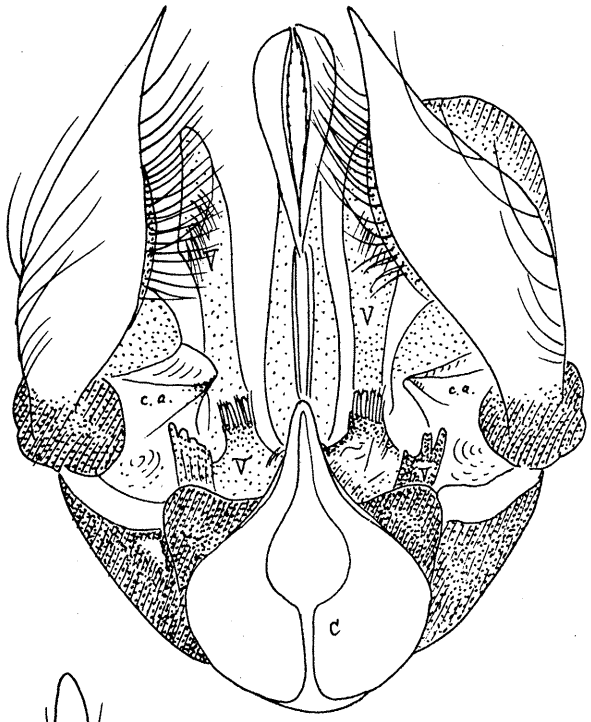
65

Figs. 63-66. The true male of Liris (Leptolarra) robustoides (Williams, 1928).

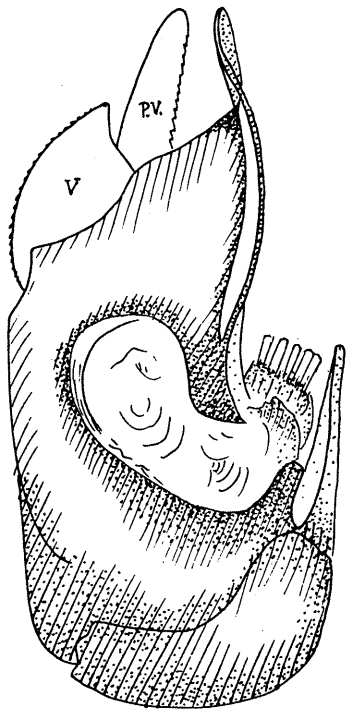


66

mesopleuron scrobal furrow distinct. Propodeum similar in the structure and sculpture to that of ♀, but the sculpture somewhat coarser, median carina reaching near apex, lateral carinae distinct till apex (in ♀ on posterior aspect at median area weaker and indistinct), transverse carinae on dorsum more broadly spaced than in ♀ and more stronger towards lateral carinae, with interspaces more distinctly rugulose, on posterior margin carina strong and complete, bi-arcuate, in middle minutely convergent towards medial furrow of posterior aspect as in ♀, generally similar in pattern to robustus, but the convergent area more minute and less distinct than in this species; on posterior aspect lateral carinae at middle area strongly zigzagged, medial excavation posteriorly turning into a fine groove and margined on both sides with fine carinae, on each side of the groove, somewhat apart from it 2 o-

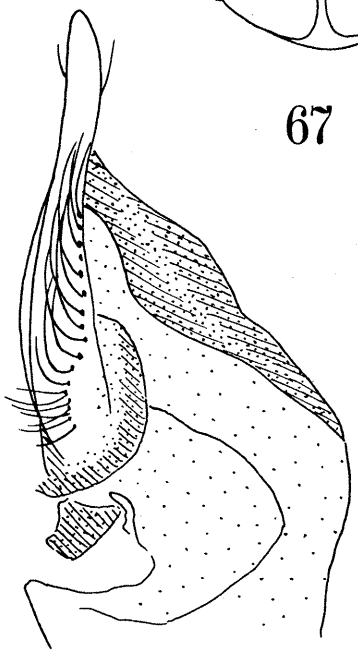


67

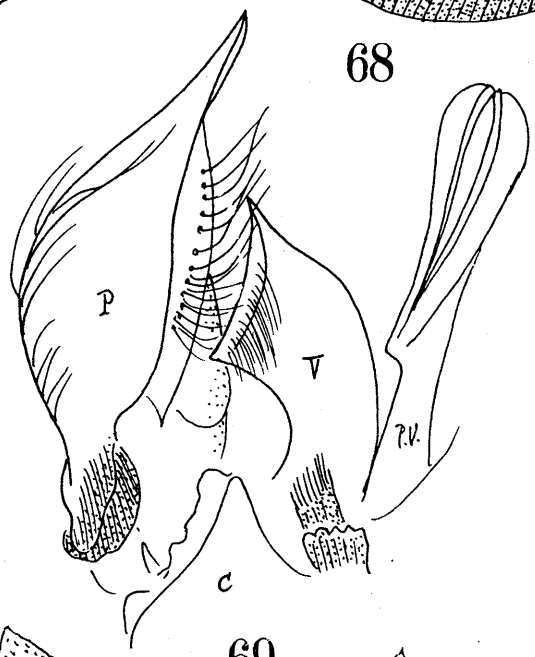


68

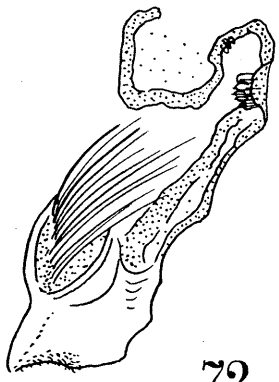
74



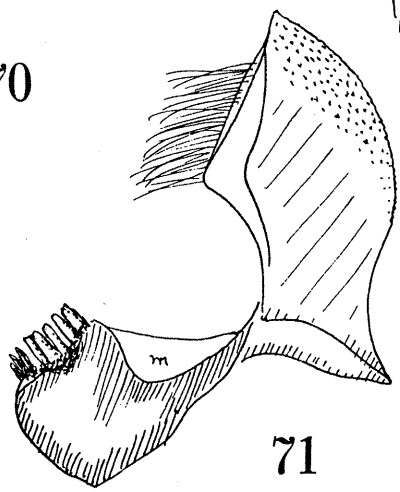
70



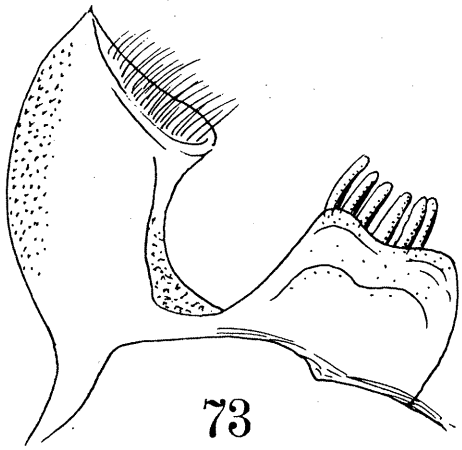
69



72



71



73

ther short carinae present, surface only at dorsal marginal area with a few transverse weak carinae that are stronger towards lateral carinae as on dorsum, rest of surface feebly rugulose; sides along dorsal carina obliquely, shortly and strongly carinate, on anterior portion carinae extended till ventral margin, rest of the surface distinctly microcoriaceous. Posterior part of mesosternum and metasternum seen from anterior side: Fig. 64 (ms mesosternum, mt metasternum), metasternum markedly roundly hollowed out, intercoxal area of mesosternum with posterior part strongly inclined posteriorly to connect with the hollowed metasternum, anterior part gently inclined towards medial fine furrow, with anterior margin bordered with a deep transverse furrow which is extended laterally till ante-coxal area of mesopleuron. GT7 with lateral margins at apical area shortly bordered with carinae and at latero-posterior corners slightly produced, GS8: Fig. 65 (inner or dorsal view), apical area markedly roundly swollen.

Genitalia in ventral view: Fig. 67, seen from left side: Fig. 68, left paramere, volsella and penis valve seen obliquely from inner-ventral side: Fig. 69 (P paramere, V volsella, P.V. penis valve, C cardo); left paramere seen vertically from inner side: Fig. 70. Generally the genitalia are very similar to those of robustus, but differs from them in the form of apical part of volsella. Paramere lobiform, slenderly attenuate apically, ventral surface gently roundly excavated across, with apparent inner margin fringed with strong dark brown bristles, basiparamere except basal ringed area not chitinized, excavated or broadly incised as seen in Fig. 68, with a subcone-shaped appendage on inner side which is not chitinized, broadly rounded at apex (c.a. in Fig. 67) and broadly roundly excavated on upper side; left volsella seen from inner side: Fig. 71, right volsella seen somewhat obliquely from apical side: Fig. 72, the same seen from inner ventral side: Fig. 73, the hair ap apical part yellowish, in some light with golden effulgence, main body with surface microcoriaceous, castaneous brown in colour, extended basal part provided with a flat semicircular prominence at base (Figs. 71 and 73) which is topped with a row of 4-5 finger-shaped attachments (but whether they are really finger-shaped processes or dense fringe of hair separately glued together in bundles is uncertain), the outer basal corner of the prominence further extended outwards as a narrow chitinized band, again enlarged into similar prominence (Fig. 67, V), thence narrowed again, turned and returned and ended at inner base of basiparamere (Fig. 72). Penis valve normal (Figs. 67, 68, 69, P.V.), in lateral view hook-shaped (Fig. 74).

In fore wing abscissae of radial vein same in both wings, increasing length order: 5=3,2≒1,4 (relative length roughly 3,3,5,6,13, but this may considerably vary). Fore femur not excavated beneath, only shortly, indistinctly flattened in middle beneath and broadly flattened at dorso-posterior side (Fig. 66, right femur seen from posterior side), hind femur almost normal, in posterior view straight beneath, only very gently excavated on basal area.

Vertex, mesoscutum and mssopleuron very minutely, closely punctured as in docilis or subtessellatus, minute punctures on mesoscutum, under high magnification, closely contiguous to each other, forming oblique or transverse puncture-lines, PIS very narrow and without microstriae, yet the punctation slightly larger and coarser than in ♀, punctures on scutellum somewhat larger and sparser than on scutum as usual.

Remarks. The true male of the present species is very similar to that of robustus, but can be distinguished from it by the presence of antennal placoids, not of rhinaria.

Supplemental notes to ♀. Clypeus with the form of apical margin and the state of bevel as in robustus, but the punctured and glabrous area above the bevel is very narrow in the present species, almost lacking and different in this respect from robustus in which the area is considerably broad.

HW:IODv=100:18. IODv,IODc,A2,A3=10,29,5.5,10. A3,4,5=10,10.5,11. Rhinaria on A5-12 present, on A5 small, spot-like, located slightly beyond middle beneath, on A6 elongate oval, about half the length of A6, with basal space broader than apical, on A7 slightly longer, on A8-12 much longer oval, leaving a very short space at base and apex. Lateral carinae of propodeum distinct, but not very high, arising slightly behind spiracles and reaching apex; dorsal and posterior aspects bordered with a pair of up-curved carinae, curving down in middle convergently to medial excavation of posterior aspect, the subtriangular area margined by the carinae smaller than in robustus. Pygidial area as given by Williams, basal bare area extended in triangle posteriorly somewhat beyond middle of the area, covering hair short and appressed, brassy in colour, mixed with a few pale brown (in some light rather whitish), moderately thick, obliquely raised and longer bristles; sides of the tergite finely closely punctured with piliferous punctules over considerable width along lateral carina of pygidium and mixed with a few stronger punctures bearing a longer erect hair; sternite 6, except lateral areas, fairly closely with gross, irregular punctures, PIS shining. Punctation on mesoscutum similar to the case of ♂, but punctures much finer and surface appearing smoother.

On the Aberrantes of L. robustus ♀ and L. robustoides ♂ (s. Tsuneki)

1. Liris (Leptolarra) robustus (Williams), ♀.

Specimen: 1 ♀, Cebu, Cantabaco, 30.III.1979.

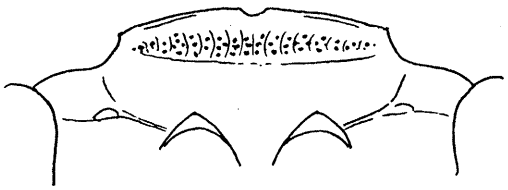
This specimen is much smaller than usual, measuring only 6.7 mm in length and in the medial form of the transverse carina at dorsal margin of propodeal posterior aspect it is just as in robustoides, yet in the pygidial characters it is much the same as robustus. Furthermore, apical margin of median lobe of clypeus in this specimen apparently lacks the minute incision at each end. Thus it appears to represent an undescribed species. However, all these differences are considered to fall within the variation range of L. lobustus, ♀:

According to my observation of 28 specimens of robustus the propodeal carina in question is considerably variable in the shape of convergency (mainly the size of the enclosed area) in middle, it varies from the typical robustus-form to near robustoides-form. The state of the present specimen is considered, therefore, to be at the extreme end of variation range of robustus.

As to the clypeus, seen under high magnification there is a very minute and feeble emargination just inside the lateral corner of apical margin of the median lobe and, therefore, the form is same pattern of structure as in typical robustus. Otherwise, in the form, inclination and punctation of the bevelled area, in the gentle reflection of the apical marginal area and in the medio-apical incision well agrees with the typical specimen.

As to the size, the specimen is considered exception, usually the female of robustus is from 8 to 10 mm in length.

In other respects the specimen is well consistent with the typical robustus:



75

HW:HL:IODv in dorsal view = 100:48:18. IODv,IODc,A2,A3=10,27,5.5,8.2. A3,4,5= 10,11,12. Rhinaria on A5-12, On A5 small and oval in form, about 1/4 the length of segment, located beyond middle beneath, on A6 about half the length of segment located apically (space left at base and at apex about 3:1), on A7 slightly larger, on A8-12 much larger, leaving narrow soace at base and apex, in form elongate oval, at base bluntly pointed and at apex rounded. Clypeus: Fig. 75. Structure of pronotum, punctation of mesothorax, sculpture of propodeum as in robustoides (except the carinae in question similar to robustus also). Pygidial area including colour of hair and bristles as in robustus. Structure of fore and hind femora are also similar.

2. Liris (Leptolarra) robustoides (Williams), ♂ (s. Tsuneki).

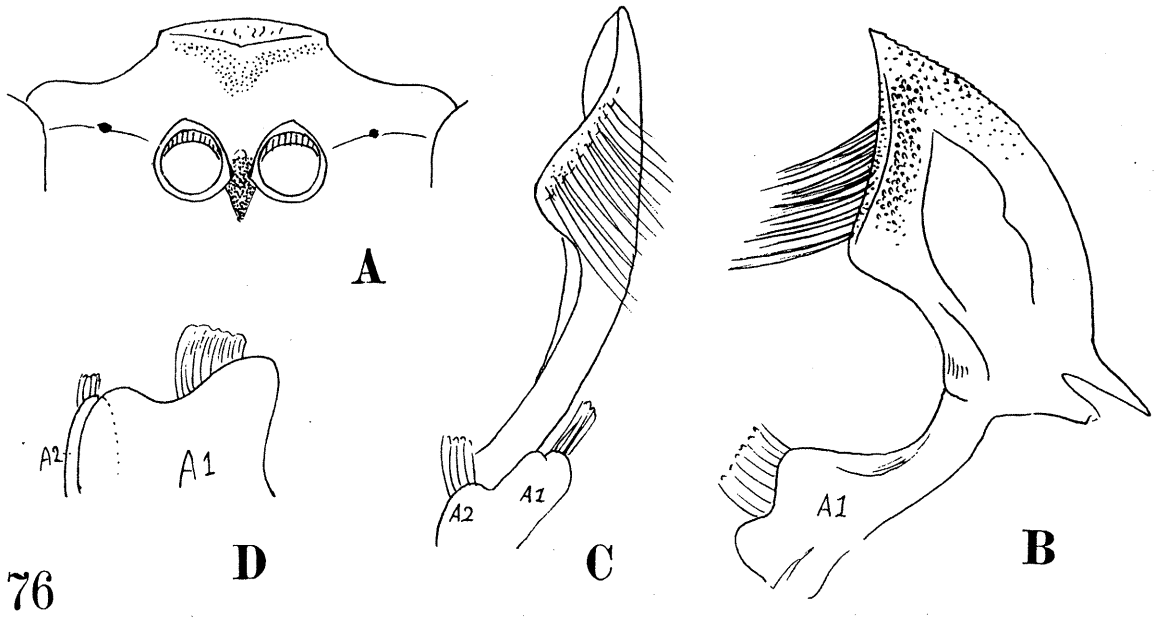
Specimen: 1 ♂, Cebu, Cantabaco, 30.III.1979.

This specimen was captured together with the above mentioned aberratio of L. robustus ♀ and at first considered to be the opposite sex of the latter - an apparent new species.

It differs from the typical robustoides ♂ markedly in the relative length of abscissae of radial vein of fore wing, namely in it abs. 3 distinctly longer than abs. 5. Further, in this specimen the clypeal bevel is more distincely outlined and, according to the examination of the genital organs, lobiform ventral surface of paramere is relatively much broader and volsella with the main body more acutely pointed at apex (Fig. 76,B lateral and C ventral) and with the larger one (Fig. 76, A,B,C, Al) of the two prominences (do., Al and A2) at base more deeply emarginate on top.

In order to see the variation of relative length of abscissae of radial vein I examine the specimens of closely allied robustus. In this species abscissa 3 is usually as long as abs. 5, but sometimes it is much longer than abs. 5. This is presumed from the usual tendency of variation in this character and it is considerable that the same is also the case in robustoides also. On the other hand, the differences in the clypeus and genital organs are only slight and considered to be within the tolerable variation range of a species. So the specimen was identified with the newly combined male of L. robustoides Williams. Main characters of the specimen:

♂. Length 6.5 mm. Clypeus: Fig.76,A. Seen from above HW:HL:IODv=100:50:23, seen



Figs. 76, A,B,C,D. Liris (Leptolarra) robustoides W., ♂, aberratio.

in front HW:HL=100:80. IODv,IODc,A2,A3=10,24,4.2,5.3. A3,4,5=10,11.5,12.3. A3=AW×1.8 (dorsal), =AW×2.0 (lateral). A3 in dorsal view with apical area abruptly widened towards apex. Antennal impressions are placoids and located on A4–13, on A4 reaching full length of the segment, but at both ends rounded (in the typical specimen not rounded, completely filling whole the span and in this respect the specimen is abnormal), in fore wing abscissae of radial vein in the following order of increasing length: 5,2,3,1,4 (right), 5,2=3,1,4 (left), relative values in right wing 5,2,3,1,4=3,4,5,7,13 and in the left = 3,5,6,7,13. Fore and hind femora as in the typical specimen. Sculpture on propodeum similar in pattern, but with lateral carinae weaker, instead the transverse striae and irregular network between them somewhat stronger. Sternite 8 similar in form and swelling and genitalia are as a whole very similar in structure. Gently excavated lobiform surface of paramere relatively slightly broader than in typical, 10:4 in the present specimen, 10:3 in the typical.

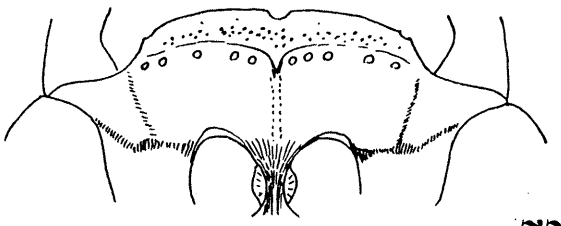
25. LIRIS (LEPTOLARRA) CAVICOLA SP. NOV.

Belongs to the minor group including xavieri m., 1977 (= williamsi m., 1976, nec Roher, 1919 and nec Krombein, 1949) and melanoptera m., 1982 and closely resembles these species, but differs from both of them in that propodeum is not provided with lateral carinae, with the surface sculpture much weaker; further, from the former in the colour and constitution of the pygidial hair and from the latter in the relative length of IODv and A3 and in the colour of the pygidial hair.

♀. 13.0 mm. Deep black, mandible on inner margin narrowly reddish brown, palpi brownish black, tegula posteriorly pale brown, a patch at base on posterior side of fore femur dark red, fore tibial spur broadly pale brown, with inner lamella translucent and slightly brownish towards base. Fore wing strongly darkened, hind wing paler, posteriorbroadly much paler, veins black, in hind wing brownish black. Hair on antenno-ocular area and clypeus short, appressed, silvery, mixed with a row of long sparse cupreously shining hairs arising from gross shallow punctures behind bevel, U-shaped pile band on mesoscutum and bands on GT1,2,3 also silvery, vestiture on other parts very short, silky white, velvety, in some light silverily glittering, short hair on rest of mesoscutum dark brown and on central part of propodeal dorsum black. Hair on pygidial area fairly long, fairly thick, very dense, appressed, lying one over other, letting ground surface completely invisible, dark brown in colour, strongly shining and mixed sparsely with moderately long and moderately thick, obliquely erect bristles, dark or pale brown in colour under varying light condition, apical spines are 7 in number in this specimen.

General structure is very similar to that of docilis-subtessellatus complex. Seen

from above HW:HL:IODv=100:46:15. IODv,IODc,A2,A3=10,31,7,10. A3,4,5=10,9,10. A3=AW× 2.3. Rhinaria on A8-11, very small, puncture-like, oval in form, on A8 about 1/10, on A9 about 1/7 and on A10 and 11 about 1/4 the length of each segment. Clypeus: Fig. 77, disc medianly gently raised from below. Structure of thorax-complex and legs as in docilis, medio-anterior depression of mesoscutum, medianly non-impressed scutellum and impressed postscutellum, laterally non-carinated propodeum also similar, median carina of propodeal dorsum not strong, reaching near apex, bordering transverse carina at posterior verge of dorsum medianly, minutely triangularly incised, the triangle longer than wide, meso- and metasternal structure generally as in docilis, but metasternum somewhat broader, pygidial area with length to maximum width appr. 2:1, lateral margins gently roundly convergent apically, apex subtruncate, gently rounded, slightly more than a 1/3 the width at base. Longitudinal carina on outer side of hind tibia acute, slightly thinly raised between 4 spines, but not so highly as to be called fin-keel.



77

Mesoscutum very finely, fairly closely punctured, but punctures not contiguous to lateral ones to form oblique or transverse lines of punctures, everywhere with narrow PIS, PIS = or < PD and under high magnification crossed with microstriae (impressed lines) as in xavieri or in melanoptera. On mesopleuron punctures much finer and closer, everywhere PIS < PD and almost without microstriae and very sparsely mixed with distinct punctures. Dorsum of propodeum transversely, fairly closely, but rather weakly rugoso-striate, interspaces forming irregular network, transverse striae somewhat stronger towards sides and at postero-lateral areas markedly strong and sparse; posterior aspect transversely rugoso-striate, striae on broad median area fine and close, on lateral areas strong and coarse; sides obliquely, fairly closely striate, striae posteriorly weaker, with surface microcoriaceous. Gaster beneath covered with velvety whitish pile and with a sparse row of a few strong bristle-bearing punctures before apical margin, sides of GT6 densely covered wtth long, soft and dark brown hair (in some light appears whitish), mixed with a few long pale brown bristles, GS6 except lateral spindle-shaped areas fairly closely covered with gross punctures, PIS shining, lateral spindle-shaped areas very minutely rugulose, dull and opaque.

♂, unknown.

Holotype: ♀, Mindanao, Cagayan de Oro, Makambus Cave, 15-16.VIII.1980, T.Murota (Coll. Tsuneki).

Remarks. Vestiture and punctation, except colouration of the hair, similar to the case of L. docilis (Smith).

26. LIRIS (LEPTOLARRA) NAGUILIANUS SP. NOV.

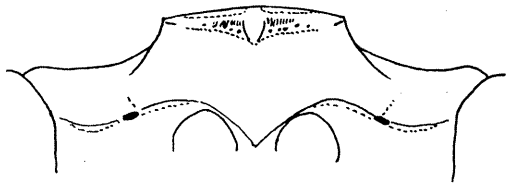
In the key of Williams (1928) the present species (♂) runs to Notogonidea negrosensis, but is different from this in many characters. The main differences are:

Antenna bears rhinaria, not placoids, radial cell of fore wing very much larger and broader, genitalia rather close in structure to those of robustus, propodeum more coarsely and irregularly reticulate.

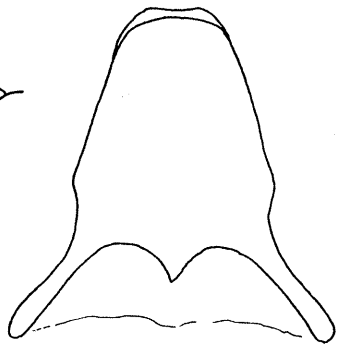
In the genitalial structure the present species is allied to robustus or robustoides (sens. Tsuneki), but different from each in the structure of lamellate appendages of basiparamere. The present species is quite particular in the form of radial cell of fore wing (Fig. 81) and can easily be separated from all the known Philippine species by this character alone.

♂. Length 8.0 mm. Black, mandible on apical half reddish brown, tegula at posterior area translucent ferruginous, mouth parts brownish black, baso-posterior patches of fore and mid femora reddish brown; hair silvery, U-shaped pile band on mesoscutum not conspicuous, in some light only discerned, pile bands on gaster on GT1-3; wings on apical half considerably clouded, but including a light clear mark at centre of the clouded area.

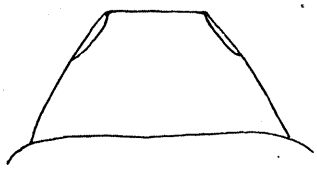
Seen from above HW:HL:IODv=100:50:20. IODv,IODc,A2,A3=10,20,5,6. A3,4,5=10,13,13, A3=AW×1.8(lateral) or AW×2.0(dorsal), rhinaria on A4-13, on 4 very small, oval in form,



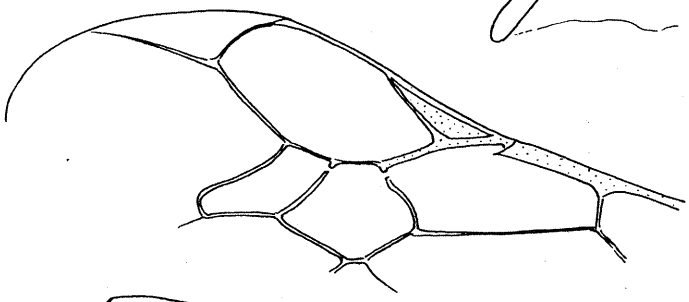
78



80

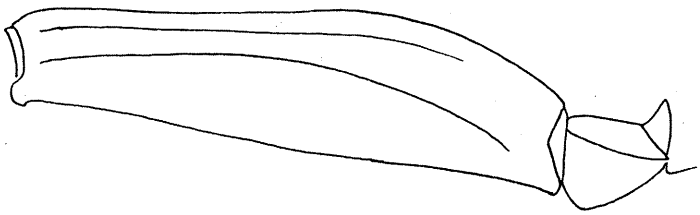


79

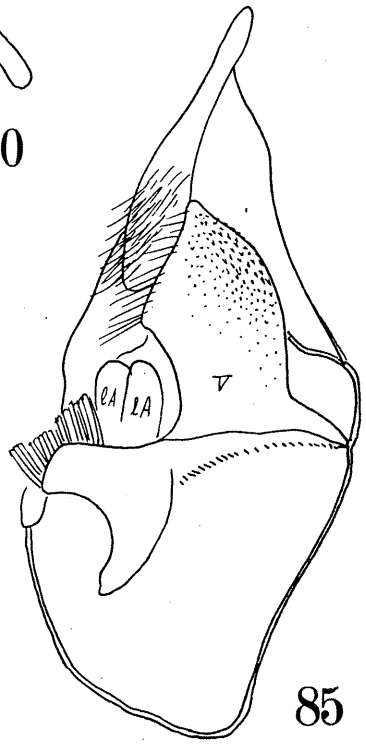


81

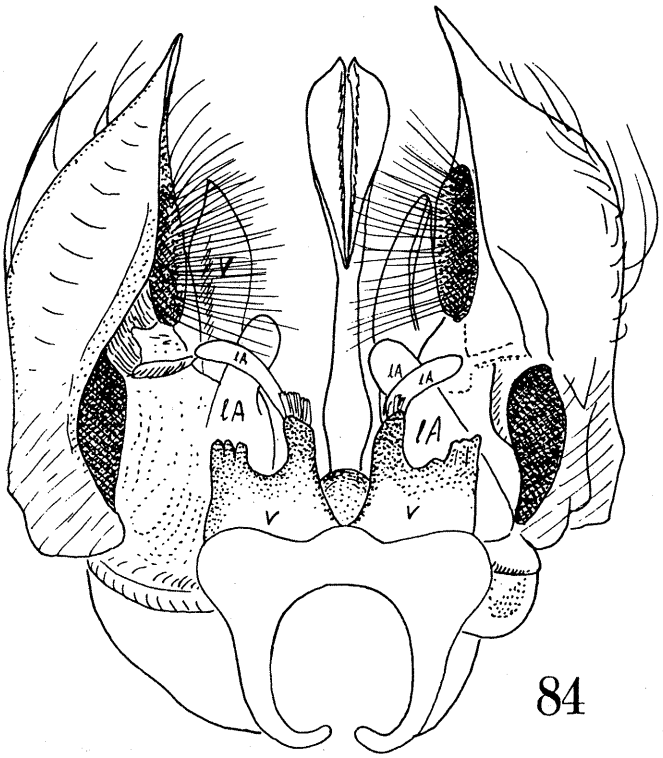
82



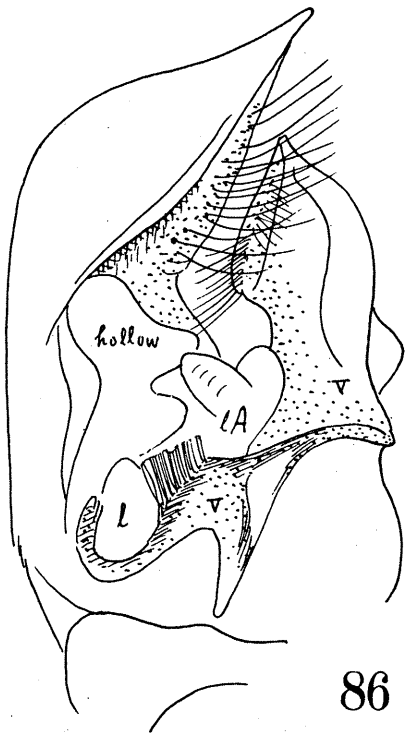
83



85



84



86

about 1/8 the length of A4, located beyond middle beneath, on A5 about half the segment length, elongate oval and pointed at base, with similar space at base and apex, on A6 more than half and on A7-9 largest, leaving narrow space on both ends, thence apically slightly slenderer and shorter, but even on A12 more than half the length of the segment and on A13 about a quarter of the length and located before middle. Abscissae of radial vein of fore wing in the following increasing order: 3=2,1,5,4, with the relative length appr. 3,3,4,6,9 (Fig. 81). Clypeus: Fig. 78, apical bevel weak, but bevelled area shining and medianly furrowed, the furrow shallowly expanded laterally into a transverse depression before apex, letting apical margin appear gently raised or reflected which is smooth and shining, surface on basal depression sparsely but distinctly punctured, disc medianly without longitudinal elevation, but at baso-medial area not strongly, subconically elevated. Structure of pronotum, mesothorax and metasternum and punctation of mesoscutum as in docilis group, scutellum and postscutellum medianly depressed, dorsum of propodeum medianly distinctly till near apical margin carinated, lateral carinae only at postero-lateral portions shortly defined, surface transversely, somewhat coarsely rugoso-subreticulate, verge to posterior aspect margined with 2 transverse carinae, with interval coarsely rugose, posterior one of which medianly curved down convergently, posterior aspect without transverse rugae, but with a few strong carinae running up divergently to about middle of the aspect, with the outer ones much longer, median furrow fine but deep, lateral carinae at postero-lateral parts only present, not long, surface minutely but distinctly coriaceous, sides except before spiracles obliquely or transversely, strongly and coarsely striate; GT7 with a pygidium, shortly margined with carinae at apical area (Fig. 79), sternite 8: Fig. 80. Fore and hind femora in posterior view: Figs. 82 and 83, both without long covering hair, the hair short, appressed, with silky shine in some light.

Genitalia in ventral view: Fig. 84 (left half slightly separated), very strongly chitinized, nearly wholly black except lamellate areas, ventral surface of paramere lobiform, gently roundly excavated across and provided on inner side with an elongated rough supporter for long bristles, basiparamere broadly hollowed out, with two (or apically divided one ?) lamellate appendages (lA) at inner margin, outer side of which is covered with basal expansion of lobiform part of paramere. Penis vlave normal in this group. Left half of genitalia except pennis valve seen from inner side: Fig. 85, volsella (V) ventrally and basally slenderly estended, with two flat prominences apically, apicalmost one turning outwards, facing ventrally, next one located in front of (more ventrally than) lamellate appendages; the left half of genitalia in ventro-lateral view (from inner side): Fig. 86 (l ... lamellate area), apical main part of volsella bearing oblique ventral surface whence fringe of hair arises.

♀, unknown.

Holotype: ♂, Luzon, Naguilian, river beach, near Baguio, 28.III.1978, C.Nozaka leg. (Coll. Tsuneki).

27. LIRIS (LEPTOLARRA) CUPREOHIRTUS TSUNEKI, 1976

Liris (Dociliris) cupreohirtus Tsuneki, Steenstrupia, 4: 64, 1976 (2 ♀, Palawan and Mindanao).

Specimen examined: 1 ♀, Luzon, Prov. Laguna, Pagsanjan, 7-9.VIII.1978, T.Murota.

The present species is characteristic in having the long, soft, rather sparse pubescence covering the body and legs and deep median incision of the clypeus. Further in this species the pygidial hair is long, dense, dark coppery in colour, with the bristles mixed sparse and comparatively short; punctures on mesoscutum comparatively less dense and larger then in docilis-subtessellatus-complex, surface without short, dense velvety pile, top of pronotal collar raised near to mesoscutal level and generally rather close to nigricans-group.

Length 12.5 mm. HW:HL:IODv=100:44:21. IODv:IODc=10:26. IODv:A3=10:10. A3=AW×3. A3,4,5,10,11,12=10,10,10,6.5,6,7. All=AW×3.

Wings hyaline, weakly clouded with pale greyisg brown, apical margin narrowly darkened.

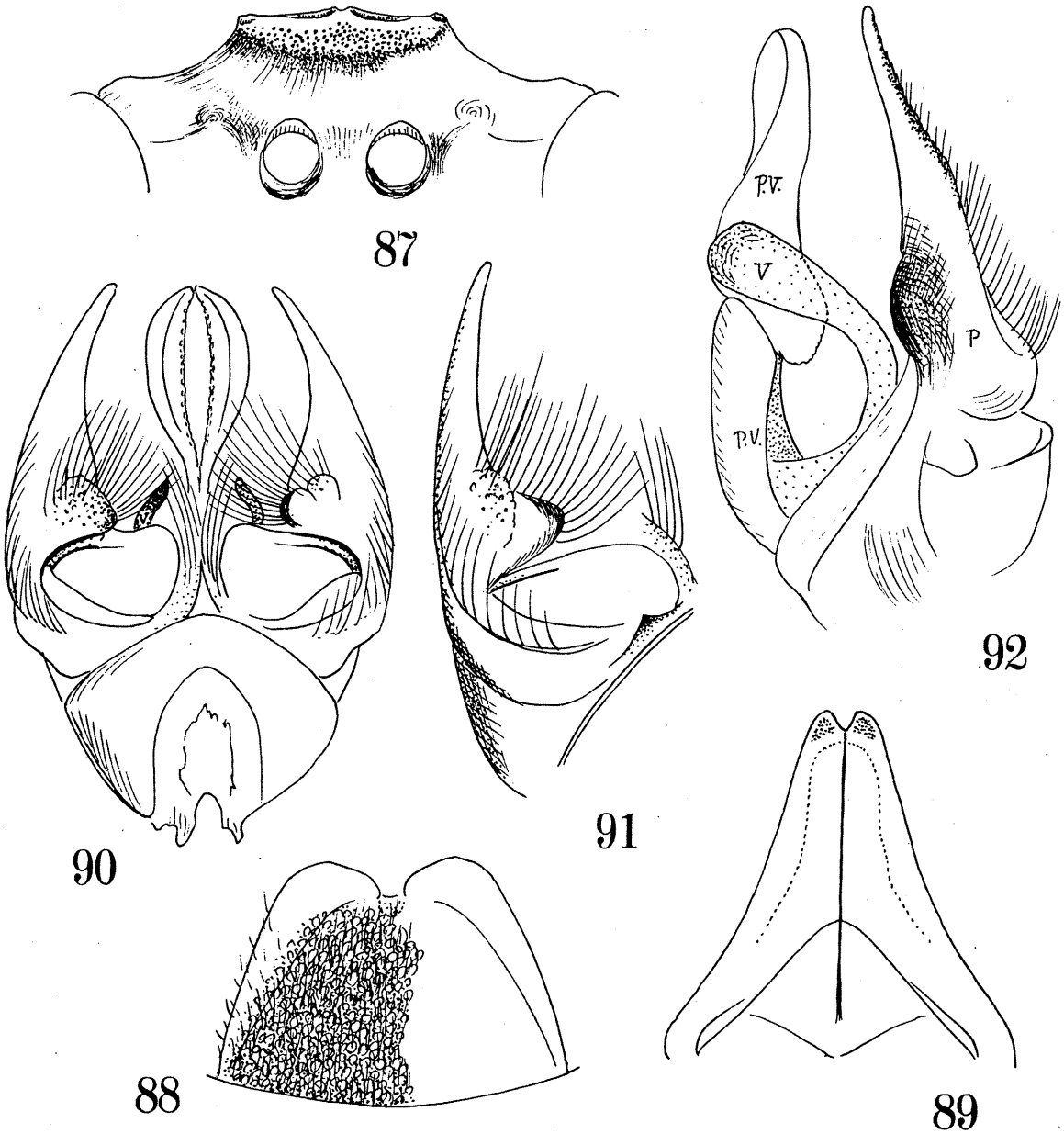
28. LIRIS (LEPTOLARRA) DAVAONIS SP. NOV.

The present species (♂) is similar in having the long, soft pubescence on dorsal

and lateral aspects of the head and thorax to L. philippinicus m., but is different from this in the structure of the clypeus and the genital organs and can easily be separated.

♂. About 10 mm. Deep black, without bluish lustre; mandible on apical fourth and inner margin ferruginous, palpi kite brown, tegula externally amber yellow; fore tibial spur, longer hind one basally, tarsal joints at apices and spines of legs pale brown, each T5 more or less brownish; wings yellowish and at the same time considerably clouded, apically more strongly so, veins dark brown. Hair on lower frons and clypeus silvery, dense and appressed, on vertex, thorax and legs till femora long, sparse and soft, about as long as A1, propodeum almost without hair; pile bands on gaster on GT1-3 as usual.

Seen from above HW,HL,IODv=100,49,24, seen in front HW:HL=100:70, IODv,A2,A3=10, 3,7. IODv:IODc=10:22. A3,4,5...12,13=10,10,10,7,8. A3=AW×2.6. Rhinaria on A5-11, elongate oval, on A5 and 11 small and on A8 largest, leaving narrow space at base and at apex. Clypeus: Fig. 87, bevel distinct, comparatively broad, closely punctured, apical marginal area thin, smooth and polished and slightly reflected, the margin almost truncate, medianly minutely produced and incised in middle, and minutely swollen at each lateral angle. Pronotal collar depressed much below level of mesoscutum, flatly wedged in-



Figs. 87-92. Liris (Leptolarra) davaonis sp. nov., ♂

to it, mesoscutum medianly distinctly and fairly broadly furrowed, the furrow shallower posteriorly and not reaching apical margin, scutellum and postscutellum medianly impressed. On mesopleuron episternal furrow broad and deep, strongly foveolate, scrobal furrow fine, distinct, sinuate, not reaching posterior margin, including 4 similar foveoles, the scrobe not particular; propodeal dorsum without lateral carinae, in lateral view dorsal aspect slightly longer than posterior aspect, forming an angle of about 120 , angled area shortly, bluntly roundly produced, posterior aspect with centro-dorsal rounded hollow, fairly broad and deep and shallowly furrowed posteriorly, reaching apex, apical area flattened and margined on both sides with carinae, the carinae diverging upwards and disappeared before reaching third from apex, lateral carinae of the aspect only on posterior third defined, at base strong and high; GT7: Fig. 88, with lateral margins broadly reflected; GS8: Fig. 89, with inner surface longitudinally roundly swollen. Genitalia in ventral view: Fig. 90, basiparamere with a broad lamellate basin and the bristle supporter whence a line of very thick yellowish (in some light golden) bristles arises, inner marginal area that is located in front of penis valve carries also a tuft of 4-5 very thick bristles (in the figures the bristles are not thickly drawn), outer margin of basiparamere also fringed with hair. Paramere seen from left side: Fig. 91, genitalia in dorso-lateral view: Fig. 92 (P.V. penis valve, P paramere, V volsella), penis valve wide and thick, with inner margin strongly serrate.

Vertex and frons finely and closely punctured, punctures on mesoscutum smaller and closer than in festinans-group, but larger, deeper and somewhat more spaced than in docilis-subtessellatus-group, under high magnification each puncture distinctly outlined, nearly rounded and deeply concave, with PIS slightly less than as wide as puncture, but not linear and apparently roundly ridged, consequently the surface appears as a whole to be granulate, on medial broad and deep furrow and on marginal pile-banded areas puncture finer, on scutellum similar, but punctures slightly larger; mesopleuron without distinct puncture, surface very minutely, but strongly microcoriaceous, main course of rugosed impressed lines on epimeral and episternal areas longitudinal, but along metapleural suture the rugulae run oblique, on prepectus concentrate around central swelling; metapleuron dorsally minutely but strongly rugulose, ventrally the rugulae weaker and surface shining. Propodeal dorsum finely and uniformly rugoso-reticulate and besides on posterior and lateral areas transversely, somewhat sparsely and distinctly striate, striae stronger towards sides, posterior aspect transversely and sides also transversely, but partly obliquely, similarly striate, with interspaces of the striae everywhere strongly microcoriaceous, not shining.

♀, unknown.

Holotype: ♂, Mindanao, Davao, Matina Height, 4.VIII.1980, K.Sabi leg. (Coll. Tsuneki).

Table 5. Variation in measurements in Liris docilis and L. subtessellatus.

Sp.	H.femur	HW : IODv	IODv:IODc	IODv:A3	A3 : A4 : A5	A3=AW
doc.	black	100 16	10 29	10 13	10 10 10	2.7
doc.	black	18	26	9	9.5 9.5	2.8
doc.	black	17	27	12	10 10	2.8
doc.	black	18	29	11	9 9	2.8
doc.	black	17	28	11	9 9	2.9
doc.	black	17	29	10	10 10	2.7
doc.	red	18	29	11	10 10	2.5
sub.	black	17	30	10	10 10	2.3
sub.	black	18	29	10	10 10	2.5
sub.	black	16	31	12	10.5 10.5	2.5
sub.	black	15	33	12	10 10	2.7
sub.	black	16	31	12	10 10	2.6
sub.	black	16	32	11.5	10 10	2.6
sub.	red	18	29	10.5	10 10	2.5
sub.	red	18	26	9	10 10	2.7

Sp. species. H.femur hind femur. HW head width. IODv interocular distance at vertex. IODc interocular distance at base of clypeus. A3 antennal joint 3. AW apical width. doc. docilis. sub. subtessellatus.

KEY TO THE PHILIPPINE SPECIES OF LIRIS (LEPTOLARRA)

♀ ♀

1. Head and thorax-complex above with long, soft and erect hair, about as long as the width of Al 2
– Head and thorax-complex above without long, soft, erect hair 4
2 Clypeus deeply incised in middle of apical margin, with bevel closely punctured almost to the margin (propodeum without lateral carinae, with comparatively deep medial furrow and fine medial carina, A4=AW×2.6, rhinaria on A5–11, large, more than 2/3 the length of each joint, wings pale yellowish brown, apical margin narrowly clouded, pygidial hair brown, with cupreous shine), 13.5 mm, Palawan and Mindanao cupreohirtus Tsuneki, 1976
– Clypeal median notch weak, bevel sparsely punctured, not to the margin 3
3 Clypeus: Fig. 17, Al bicarinate, A4=AW×4, rhinaria usually on A5–11, fore tibia spinose in front, propodeal dorsum with lateral carinae, pygidial hair short, less dense, pale yellow, 11–12 mm, widely in the Philippines philippinicus Tsuneki, 1982 (=liroides Williams, nec Turner)
– Clypeus: Fig. 20, Al unicarinate, A4=AW×3, rhinaria usually on A7–11, fore tibia without spine in front, propodeal dorsum without lateral carinae, pygidial hair long, dense and dark brown in colour, 11.5 mm, Luzon baguionis sp. nov.
4 Median lobe of clypeus very deeply incised in middle (with punctures almost to the margin) 5
– Median incision of clypeus not so deep, or without incision 6
5 Wings strongly darkened, with distinct purplish shine, large species, 19 mm (clypeus: Fig. 94, rhinaria on A5–11, comparatively large, pygidial hair dark coppery), Tawitawi peterseni Tsuneki, 1976
– Wings weakly clouded, apically narrowly darkened, 13 mm (clypeus: Fig. 95, IODv=A3, A3=AW×2.5, rhinaria on A7–12, fairly large, propodeum with lateral carinae, not strong, anteriorly indistinct), Palawan turneri Tsuneki, 1976
6 Bevel of clypeus closely punctate almost to the apical margin, margin subtruncate, minutely incised in middle (four pile bands on gaster present, propodeal dorsum without lateral carinae, A3=AW×2.3, rhinaria very small, on A5–11, wings strongly yellowish, hair on clypeus silvery-golden, pygidial dense hair usually golden, sometimes nearly silvery, sparse erect hair fine, not spine-like), 11–16 mm, widely in the Oriental Region laboriosus (Smith, 1856)
– Not in above combination 7
7 Hind femora and all tibiae reddish (mandible nearly wholly red, HW:IODv=3:1, A3=AW×2, rhinaria on A6–11, small, propodeal dorsum with weak lateral carinae), 11–13 mm larriformis (Williams, 1928)
– All tibiae not red 8
8 Disc of pygidium with a bare, polished and wedge-shaped area extending from base to middle or beyond 9
– Pygidium completely covered with hair, if incised with basal bare area it is roundly emarginate 10
9 Ridges and depressions on vertex normal, bare wedge-shaped area of pygidium almost completely impunctate, median lobe of clypeus moderately long, with distinct shining bevel, apical margin gently rounded out, with medial and latereal minute incisions (Fig. 311, HW:IODv:A3=5:1:1, A3=AW×2.3, rhinaria on A6–12, comparatively large, propodeum with distinct lateral carinae), 9–11 mm robustoides (Williams, 1928)
– Ridges and depressions on vertex very weak, bare area of pygidium with sparse distinct punctures, median lobe of clypeus markedly short (Fig. 28), without bevel, apical margin nearly truncate and medianly gently emarginate (HW:IODv:A3=7:1:1, A3=AW×2.5, rhinaria on A6–12, small, propodeum with lateral carinae, very strong), 6.5 mm negrosensis (Williams, 1928)
10 Median furrow of posterior aspect of propodeum widely diverging above as a pair of raised, often interrupted arcs which may extend to the sides of the segment (propodeum with distinct lateral carinae, HW:IODv=6:1, A3=AW×2.3, rhinaria on A5–12, apically large), about 10 mm robustus (Williams, 1928)
— Not as above 11
11 Bristles on pygidium long and stout 12

— Bristles on pygidium not long, delicate 13

12 Median lobe of clypeus broadly rounded out, almost without medial incision, with lateral angles rather obtuse (bevel markedly broad, see Fig. , lateral carinae of propodeal dorsum not well developed, HW:IODv=7:1, IODv:A3=2:3, A3=AW×3, A3=4=5, rhinaria on A7-11, small, spot-like), 12-15 mm
silvicola (Williams, 1928)
(=mindanao Menke, 1976)

— Median lobe of clypeus (Fig. 96) gently rounded out, medianly minutely produced and incised in middle, lateral corners nearly rectangular (bevel broad, propodeal dorsum almost without lateral carinae, IODv:A3=3:5, A3=AW×3.3, A3 4, rhinaria on A7-11, not large), 17 mm palawanus Tsuneki, 1976

13 Pronotum depressed much below level of mesoscutum, punctures on head and thorax very fine and dense 14

— Pronotum with median top raised to near level of mesoscutum, punctures on head and thorax slightly large and not so dense, with more or less PIS 25

14 Gaster with pile bands on GT1-4, on GT4 laterally indistinct (clypeal bevel sparsely punctured to near apical margin, propodeal dorsum with distinct lateral carinae, IODv slightly less than A3, A3=AW×2.7, rhinaria on A7-11, small), 11-13 mm rohweri (Williams, 1928)

— Gaster with pile bands on GT1-3 15

15 Hair on head and thorax and gastral pile bands golden (clypeal bevel finely, sparsely punctured, not to near apical margin, pygidial hair dark brown, IODv less than A3 in length, rhinaria on A6-11, small), 16-21 mm
deplanata (Kohl, 1883)

— Hairs and pile bands silvery 16

16 IODv:A3=3:4 (A3=AW×2.7, rhinaria on A6-11, small, clypeus: Fig. 97, wings fairly darkened, less yellowish, pygidial hair long, dense, castaneous brown, lateral carinae of propodeal dorsum weak, incomplete), 13 mm
nielseni Tsuneki, 1976

— IODv=A3 (IODv often slightly shorter than A3, but not so marked as above) .. 17

17 Lateral carinae of propodeal dorsum completely lacking (clypeus: Fig. 99, A3=A4, A3=AW×2.4, rhinaria on A7-11, very small, sometimes on 8 lacking, clypeal hair silvery, gastral pile bands sometimes slightly brassy, pygidial hair sometimes silvery, or yellowish, in some light dark brown), 10-11.5 mm, Mindanao and Palawan cameroni Tsuneki, 1976

— Lateral carinae of propodeal dorsum present, but sometimes incomplete and weak 18

18 Hind femur red, sometimes only partly so 19

— Hind femur black 20

19 SemiCML:CLL=10:6.5 or less subtessellatus (Smith, 1856)

— SemiCML:CLL=10:7.5 or more docilis (Smith, 1873)

20 Wings fairly strongly clouded, hair of pygidial area golden (A3=AW×2.3, propodeal dorsum with lateral carinae, sculpture of propodeum coarser than in docilis) 21

— Wings not markedly clouded, pygidial hair not golden 22

21 Clypeus: Fig. 98, apical margin strongly roundly produced, lateral carinae of propodeal dorsum weak, often partly incomplete, rhinaria on A8-11, 12.5-13.5 mm, Palawan xavieri Tsuneki, 1977

— Clypeus: Fig. 100, apical margin less strongly roundly produced, lateral carinae of propodeal dorsum strong and complete, rhinaria on A7-11, 12.0 mm, Palawan carinatus Tsuneki, 1976

22 Wings yellowish basally, sculpture on propodeal dorsum weak, transversely and finely and closely ruguloso-striate, pygidial hair short, rather sparse, silvery, erect hair scarce and fine, indistinct (pile bands on gaster GT1-3, silvery, IODv:A3=10:9-12, variable, A3=AW×2.5-2.8, rhinaria on A7-11, often on 6 present), 10-13 mm 23

— Not in above combination (IODv=A3, rhinaria usually on A7-11, lateral carinae of propodeal dorsum weak and incomplete) 24

23 SemiCML:CLL=10:6.5 or less subtessellatus (Smith, 1856)

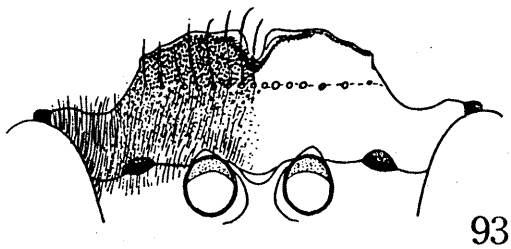
— SemiCML:CLL=10:7.5 or more docilis (Smith, 1873)

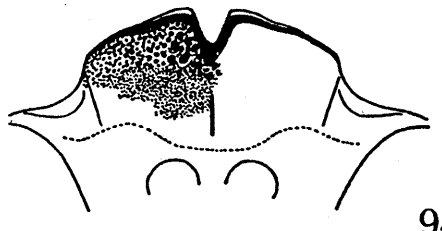
24 A3=AW×2.2, pygidial hair comparatively long, but sparse, pale brassy, surface punctures well visible (clypeus: Fig. 102, ground pile on thorax less dense, not velvety), 10.5 mm, Tawitawi smithi Tsuneki, 1976

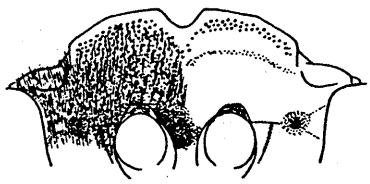
— A3=AW×2.6, pygidial hair comparatively short, sparse, pale golden, in some light coppery, clypeus: Fig. 101, 13.5 mm, Tawitawi
semicarinatus Tsuneki, 1976

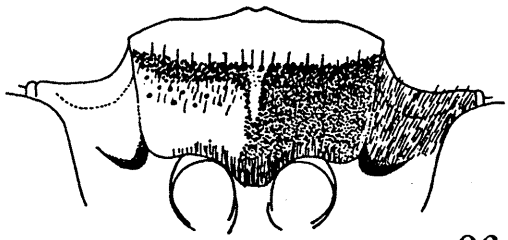
25 Shining pile bands on gaster on GT1-4 (lateral carinae of propodeal dorsum present, but covered with hair, rhinaria on A6-11, large, IODv:A3=10:7, A3=AW×2), 6-8 mm, Formosa and Luzon albopilosus Tsuneki, 1967

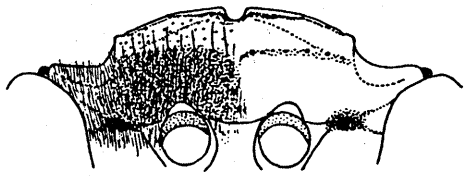
— Shining pile bands on gaster on GT1-3 26
26 A3=AW×2.3, HW:IODv=5:1, IODv distinctly greater in length than A2+3, 6-8 mm
festinans (Smith, 1859)
— A3=AW×2, HW:IODv=4:1, IODv as long as A2+3 (GT4 and 5 densely covered with short pile, not forming shining bands), 8-9 mm bakeri (Williams, 1928)

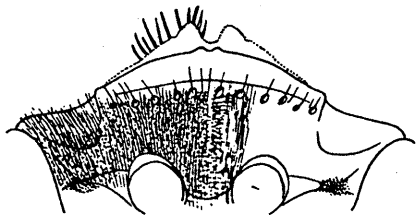

93

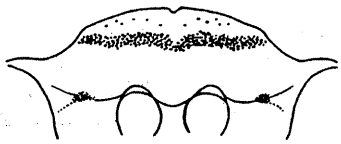

94

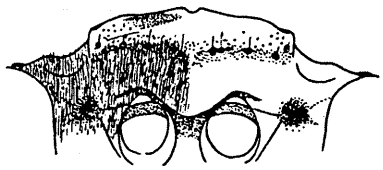

95

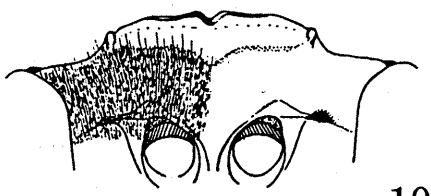

96

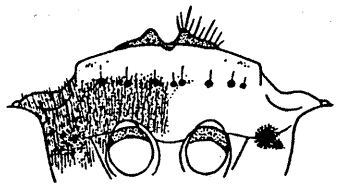

97


98


99


100


101


102

Figs. 93-102. Clypeus. 93 cupreohirtus. 94 peterseni. 95 turneri. 96 palawanus. 97 nielseni. 98 xavieri. 99 cameroni. 100 carinatus. 101 semicarinatus. 102 smithi.

♂ ♂

1. Head and thorax with long, soft, sparse erect hair which is as long as the width of A1 2
- Not as above 4
2 IODv slightly less than as long as A2+3 makiling Tsuneki, 1982
(=silvicola s. Williams, nec ♀)
- IODv as long as A2+3 3
3 Apical margin of median lobe of clypeus gently rounded, nearly straight, with

lateral angles almost rectangular, 8–9 mm philippinicus Tsuneki, 1982 (liroides Williams, nec Turner)

– Clypeus: Fig. 87, 10 mm davaonis sp. nov.

4 Apical margin of median lobe of clypeus subtruncate, widely, shallowly and subtriangularly emarginate, bevel distinct (hair on frons and clypeus brassy), 7–10 mm laboriosus (Smith, 1856)

– Apical margin of median lobe of clypeus distinctly rounded out 5

5 Hind femur at least in part and all tibiae more or less reddish, 7–8 mm larriformis (Williams, 1928)

– Not as above 6

6 Pronotal collar depressed much below level of mesoscutum 7

– Pronotal collar raised to near level of mesoscutum (punctures on mesoscutum slightly large, slightly sparse, with more or less shining PIS, hair on propodeal dorsum directed forwards) 15

7 Punctures on mesoscutum shallow, very fine and dense, linearly arranged, surface appears smooth 8

– Punctures on mesoscutum slightly large, but close, appearing granulate, not smooth 12

8 Apical margin of median lobe of clypeus incised in middle, 7–10 mm 9

– Apical margin of clypeus not incised in middle (A3 shorter than A4), 6–8 mm 10

9 Fore femur in posterior view: Figs. 39–40 subtessellatus (Smith, 1956)

– Fore femur in posterior view: Figs. 36–38 docilis (Smith, 1873)

10 A4–13 with placoids (propodeal lateral carinae sometimes distinct, sometimes incomplete and weak), about 7 mm robustoides (Williams, 1928) (s. Tsuneki)

— A4–13 with rhinaria, medianly large and smaller to both ends of the series 11

11 Radial cell of fore wing normal, length to maximum width less than 3:1 robustus (Williams, 1928)

— Radial cell exceptionally large and broad (Fig. 81), length to maximum width about 2:1 naguilianus sp. nov.

12 Apical margin of median lobe of clypeus distinctly rounded out, almost or completely without median notch 13

— Apical margin of clypeus medianly weakly incised or emarginate 14

13 Clypeus: Fig. 45, antennal placoids on A4–13 (dorsum of propodeum almost without lateral carinae), 9–11 mm silvicola (Williams, 1928) (s. Tsuneki)

— Clypeus: Fig. 59, placoids usually on A6–11, 6.5 mm ligulatus (Williams, 1928)

14 Lateral carinae of propodeal dorsum strong and distinct, IODv less than A2+3, 7–11 mm rohweri (Williams, 1928)

— Lateral carinae of propodeal dorsum indistinct, IODv slightly more than A2+3, 6 mm hanedai Tsuneki, 1971

15 IODv much less than A3+4, shining pile bands on gaster on GT1–3 only, rhinaria or placoids usually on A6–9, sometimes on 8 or 8–9 lacking (apical margin of clypeus not toothed in middle), 6–7 mm festinans (Smith, 1859)

— IODv = or > A3+4, shining pile bands on GT1–4 present, rhinaria or placoids usually on A6–12 (apical margin of clypeus medianly slightly produced or toothed) 16

16 IODv > A3+4, placoids on large, tarsi largely black, 6.5–7.5 mm bakeri (Williams, 1928)

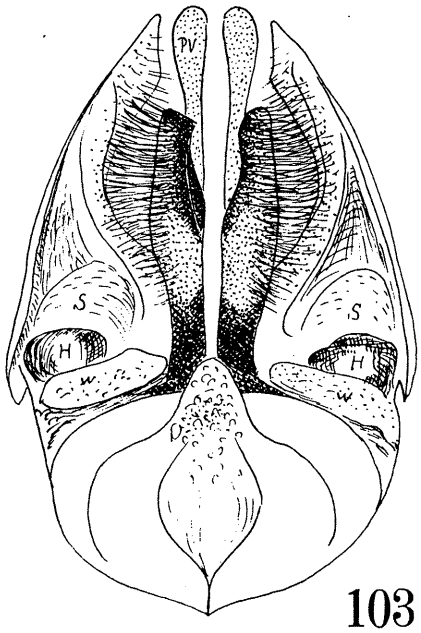
— IODv=A3+4, placoids at base and apex small, tarsi brownish, 5–6 mm, Formosa and Luzon albopilosus Tsuneki, 1967

29. DICRANORHINA RITSEMAE MINDANAONIS SSP. NOV.

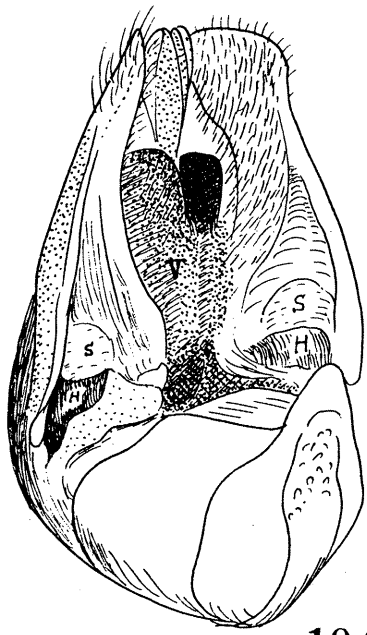
Typical: Piagetia ritsemae Ritsema, Ent. Mon. Mag., 9: 122–123, 1872 (♀, Java, figs.).
Ssp. luzonensis:
Dicranorhina luzonensis Rohwer, Bull. Exp. Ata. Hawn. S.P.A., Ent. Ser., 14: 6–7, 1919 (1 ♀ 1 ♂, Luzon).
Dicranorhina luzonensis: Williams, Ibid., 19: 86, 1928 (13 ♀ 12 ♂, Luzon: Los Banos)
Piagetia ritsemae luzonensis: van der Vecht, Ent. Meded. Ned.-Ind., 3 (2): 25, 1937 (in connection with P. caerbicola Vecht).
Dicranorhina luzonensis: Krombein, Proc. Hawn. Ent. Soc., 14(1): 141, 1950 (Palau).
Dicranorhina ritsemae luzonensis: Bohart & Menke, World Sphecid., p. 252, 1976 (listed).

The present specimens (♀ ♂) of this species from the Mindanao, Negros and Cebu differ from ssp. luzonensis mainly in that mid legs are considerably broadly and hind legs are partly reddish ferruginous and from the Javanese typical form in that hind legs are nearly wholly and mid legs considerably broadly black, that is to say, the new subspecies is intermediate in colouration between the two subspecies hitherto known. In vestiture, structure and sculpture well agrees with ssp. luzonensis.

♂. Length 6.5–9.0 mm. In the bright coloured (Mindanao) specimens reddish ferruginous are Al largely, clypeus wholly, mandible except brown apical part and inner tooth, mouth parts, lateral areas of pronotal collar, tubercle, prosternum wholly, subalar area, gastral socket, G1 beneath wholly, G7, fore leg completely, mid leg broadly (coxa except base, trochanter largely, femur except beneath and tibia fairly broadly) and hind

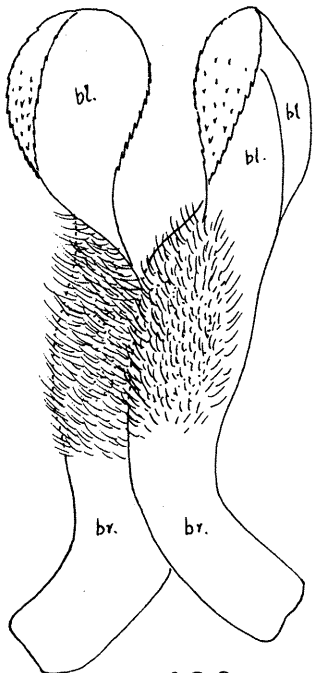


103



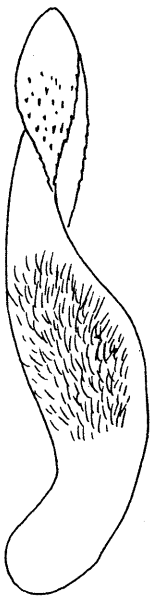
104

105

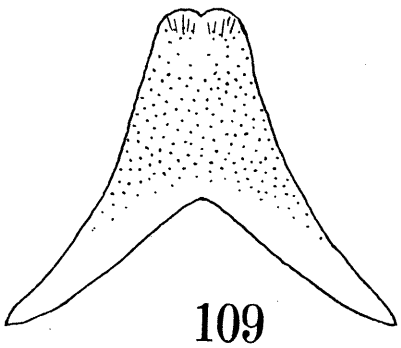


106

108



107



109

Figs. 87 - 93. Dicranorhina ritsemae mindanaonis ssp. nov. Male genitalia and sternite 8.

leg partly (apex of coxa, parts of trochanter and a vaguely outlined broad patch at base of femur above). Al sometimes variously blackish on dorsal side, clypeal red variable in extent, most usually on apical half, sometimes only on a median area and the apical teeth. Generally the specimens from Cebu and Negros are somewhat darker, rather intermediate between populations of Luzon and Mindanao, namely in most specimens sides of pronotal collar, subalar area of mesopleuron, mid coxa and trochanter largely and mid femur and tibia considerably and hind leg completely black, but some specimens are nearly equal to the Mindanao specimens.

♀. In coloration similar to ♂, variation between populations is also similar, but mid leg is more broadly reddish than in ♂ and hind femur carrying reddish patch at base.

Measurements. ♂: HW:IODv=100:26. IODv:IODc:A3=10:21:7. A2,3,4,5=5,10,9,9. A3, 4,5 from above narrow and rather suddenly incrassate at apex, in lateral view broadest, smoothly and gently broadened apically. A3=AW×3.3(dorsal) and =AW×3.0(Lateral).

♀: HW:IODv=100:26. IODv:IODc:A3=10:21:8.5. A2,3,4,5=5,10,9,9. A3=AW×3.5(both).

Hind femoral prominence at base beneath is very short and rounded in ♀, in ♂ more or less variable in relative length, thickness and form. Wing fascia always present in fore wing.

Male genitalia seen from beneath: Fig.103, obliquely from left side: Fig.104, obliquely from behind: Fig.105, volsella seen obliquely from right side: Fig.106, left half seen from beneath: Fig.107. Paramere near base on outer side with a thin projection directed basally, ventral side at base with a yellowish wadding (W) and roundly hollowed (H) and then gently roundly swollen above it (S), apical half on inner surface densely covered with long hair (Fig.103); volsella jet black on apical half and yellowish brown on basal area, apical area flatly compressed laterally, rounded in outline, but ventral side enlarged into spindle-shape, with finely serrate margins and shortly spinulose surface, as a whole twisted and basally flately faced ventrally, there the surface densely covered with short erect hair (Figs.106 and 107). Penis valve with apical part rounded lunate in form, in ventral view acutely edged ventrally, the edge strongly serrated in lateral view and excavated below into hook-shape (Fig.108, obliquely from beneath). Sternite 8 (Fig.109) most usually with apical margin gently emarginate or weakly subtriangularly incised, but in some specimens it is subtruncate or slightly rounded out.

Holotype: ♂, Mindanao, Makahambus Cave, Cagayan de Oro, 15-16.VIII.1980, T.Murota (Coll. Tsuneki).

Paratypes: 1 ♀ 6 ♂ (leg. T.Murota), 5 ♂ (leg. C. Nozaka), 1 ♂ (leg. T.Tano), the same locality and date. (Coll. of each collector).

Other specimens: 1 ♀ 6 ♂, Cebu, Cantabaco, 30.III.1979, C.Nozaka; 1 ♂, Negros, Mambucal, 2-3.IV.1979, C.Nozaka.

Remarks. The difference in colour of the Cebu and Negros specimens may be due to the seasonal variation.

30. TACHYTES SAUNDERSII SULUENSIS WILLIAMS, 1928

Tachytes suluensis Williams, Bull. Exp. Sta. Hawn. S.P.A. Ent. Ser., 19: 88, 1928 (♀ ♂, Mindanao).

Tachytes saundersii suluensis: Pulawski, J. Wash. Acad. Sci., 64 (4): 317, 1974 (rev. Mindanao paratypes).

Tachytes saundersii suluensis: Bohart & Menke, World Sphecid., p. 266, 1976 (listed).

Specimens examined: 1 ♀ 11 ♂, Mindanao, Zamboanga, 30.VII.-1.VIII.1980: 1 ♀ 2 ♂, near beach, 1.VIII., C.Nozaka; 7 ♂, Pasonanca Park, 30-31.VII., T.Tano; H.Kurokawa; T.Murota.

Remarks. Subspecies suluensis differs from the typical form (= formosanus m.) in lacking the silvery pile bands on gastral tergites 1-3. According to Pulawski (1974) the penis valve of suluensis differs from that of the typical form in that preapical notch is about twice as wide as in this, while in the latter identical with that of the Formosan specimens. Comparative observation on the penis valve of the present Mindanao specimens revealed, however, that they are quite identical in form.

Apparently this subspecies is endemic to the Mindanao, known from Dapitan, Surigao and Zamboanga only.

31. TACHYTES SURIGENSIS WILLIAMS, 1928

Tachytes suri ensis Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 88, 1928 (5 ♂ 1 ♀, Mindanao: Surigao).
Tachytes surigensis: Bohart & Menke, World Sphecid., p. 267, 1976 (? = modestus)

Specimens examined: 3 ♂, Mindanao, Zamboanga, Pasonanca Park, 30-31.VII.1980, T.Murota et K.Sabi leg.

Remarks. Williams did not know that this species was very similar in external characters to Tachytes modestus Smith and so he was not warranted with the taxonomic question about their relationships. However, to those who know about T. modestus it is a serious problem whether they are conspecific or not. Certainly T. surigensis is very closely related to T. modestus not only in the external characters, but in the general pattern of the genitalial structure also and we are tempted to consider it to be a local race of this species. The detailed comparative study shows, however, that they are sufficiently different from each other to be separated at the species rank as given below: In T. surigensis,

1. Femora more broadly black, knees only ferruginous yellow.
2. Tibiae and tarsi more yellowish and less reddish.
3. Tibiae on inner side more or less and mid and hind tarsi broadly (except each base) darkened.
4. Flagellar joints of antenna slightly longer, A3 in dorsal (narrowest) view = AW×2.5 (in modestus =AW×2.0).
5. Penis valve with dorso-apical angle more rounded (Fig. 110, cf. Fig. 115) and in dorsal view much less triangular (Fig. 111, cf. Fig. 116).
6. Median prominence at outer margin of paramere with apex rounded (Fig. 112, cf.

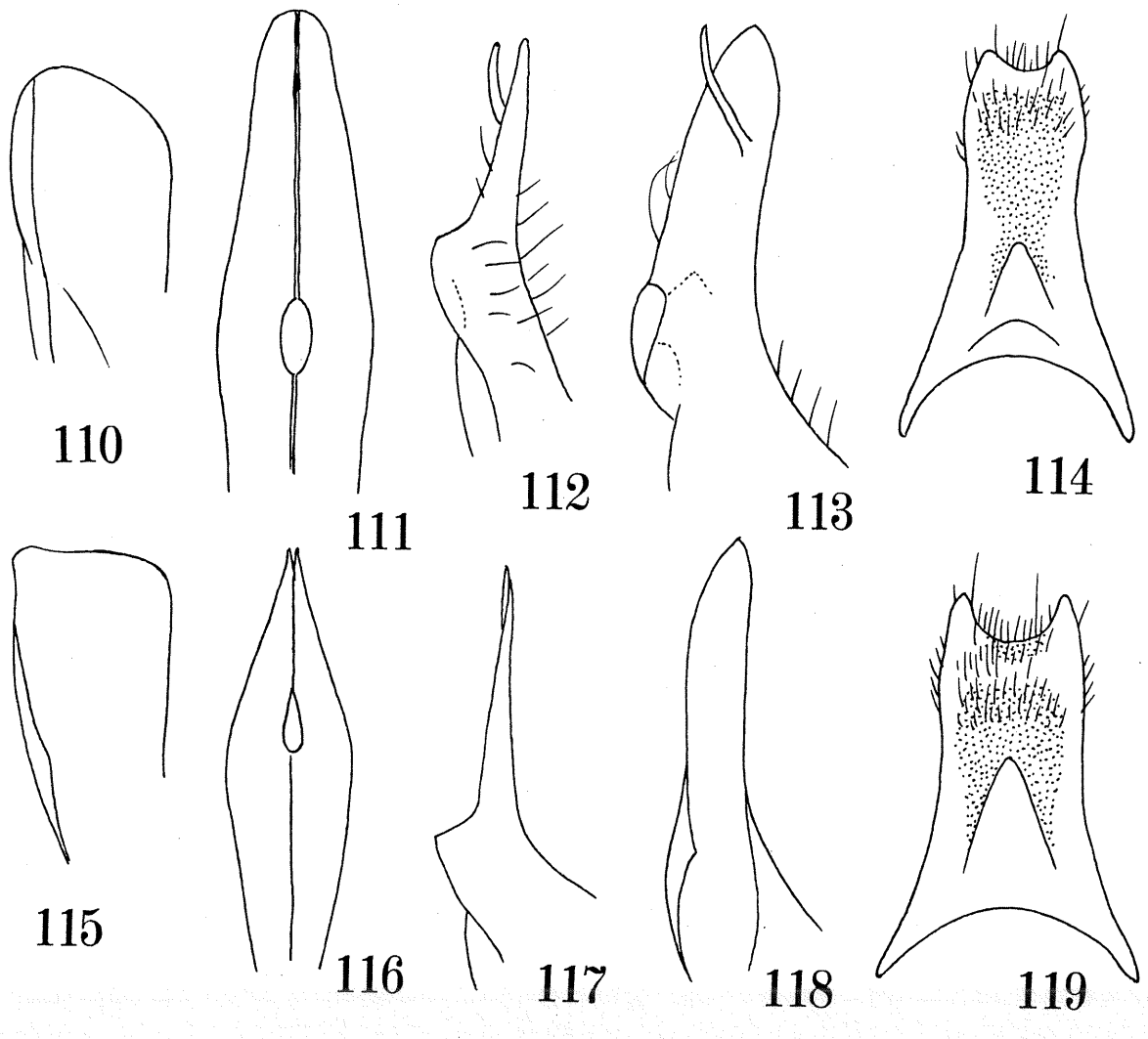


Fig. 117 in modestus).

7. Apical part of paramere relatively shorter and broader, with a very thick hair (dark grey in colour) on dorsal side beyond middle (in modestus always lacking, Fig. 113 cf. Fig. 118).

8. GS8 with apical arms shorter and emargination shallower (Fig. 114, cf. Fig. 119).

As to the detailed structure of genitalia and GS8 see Tsuneki, 1964 (Etizenia, 5: 6).

Measurements(♂) (within parenthesis modestus ♂):

Seen from above HW,HL,IODv,A3=100,47,20,16 (=100,45,18,14). Seen in front HW,HL, IODc=100,89,56 (=100,90,55). AOD,WAS,IAD,ACD=5,3,4,0 (=5,3,4,0). A3,4,5,12,13=10,10.5, 10.5,9,9.5 (=10,11,11,8,10). A12=AW×3.0 (=AW×2.4).

Length of the 3 specimens observed: 13.0, 11.0 and 11.7 mm respectively and they are slightly slenderer than modestus in general.

32. TACHYTES MODESTUS BANOENSIS ROHWER, 1919 (N. STAT.)

Tachytes banoensis Rohwer, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 14: 8, 1919 (1 ♀, Luzon, Los Banos).

Tachytes banoensis: Williams, Ibid., 19: 89, 1928 (41 ♀ 75 ♂, Luzon, Negros, Leyte, Sammar and Mindanao).

Tachytes banoensis (ssp. palawanicus): Tsuneki, Steenstrupia, 4: 48, 1976 (4 ♀ 2 ♂, Palawan and Balabac).

Tachytes borneanus: Pulawski, J. Wash. Acad. Sci., 64 (4): 317, 1975 (banoensis is a synonym, morphologically identical with modestus).

Specimens examined: 7 ♀ 11 ♂, Mindanao; 3 ♀ 4 ♂, Luzon:

Mindanao specimens: 3 ♀ 2 ♂, Zamboanga, 30-31.VII.1980, C.Nozaka(1♀), T.Tano(1♀ 1♂), H.Kurokawa(1♂), T.Murota(1♀); 5 ♂, Davao, near beach, 5.VIII.1980, C.Nozaka(4♂), T.Tano(1♂); 2 ♀ 4 ♂, Bukidnon, Malaybalay, 800 m, 13.VIII.1980, T.Murota(1♀1♂), T.Tano (1♀3♂); 2 ♀ 1 ♂, Cagayan de Oro, Makahambus Cave, 15-16.VIII.1980, T.Murota.

Luzon specimens: 1 ♂, Prov. Laguna, Alaminos, Hidden Valley Spring, 6.VIII.1978, T.Murota; 1 ♂, Pagsanjan, 7-9.VIII.1978, H.Kurokawa; 3 ♀ 1 ♂, Prov. Camarinessur, Calabanga, Naga City, 15.VIII.1978, C.Nozaka(1♀1♂), T.Tano(2♀); 1 ♂, Prov. Albay, St.Domingo, 17.VIII.1978, T.Murota.

Remarks. The present subspecies is apparently much farther apart from the nominate form modestus than surigensis is, having the broadly darkened legs, but in the structure of the male genital organs it is almost completely identical with modestus.

Colour of legs. Black, with the following portions ferruginous: Fore tibia except folded side, base and apex of fore tarsal joints, knees and base externally of mid and hind tibiae, spurs, mid and hind tarsi apically beneath and claws. But the ferruginous areas are markedly varied in extention. Sometimes fore tibia and tarsus completely ferruginous, mid and hind tibiae at base broadly and -tarsi apically distinctly ferruginous. Sometimes, however, the colour is quite restricted: fore tibia narrowly in front or on inner side, base of fore Tl, knees narrowly of mid and hind legs, spurs (longer hind one dark brown) and claws alone ferruginous. Between these two extremities various intermediate colouration are observed.

While, the vestiture, form of clypeus, relative length of antennal joints, pile bands on gaster and colour and venation of wings are similar to those of modestus.

In the male genitalia (4 specimens examined) the medial reflected prominence on outer side of paramere is broadly rounded at outer margin, not angled as in the typical form (in this respect rather close to surigensis), but in other characters well consistent; in GS8 generally similar, but apical emargination is slightly shallower, but not so much as in surigensis.

Measurements (within parenthesis modestus):

♀. HW,HL,IODv,A3=100,44,20,14 (=100,44,18,14). HW,HL,IODc=100,84,58 (=100,88,58). AOD,WAS,IAD,ACD=5,3.5,4.5,0 (=5,3,4,0). A3,4,5,11,12=10,10.5,10,7,9 (=10,10.5, 9.5,7,8.5). A3=AW×2.2 (=AW×2.3), A11=AW×2.5 (=AW×2.3).

♂. HW,HL,IODv,A3=100,47,19,14 (=100,45,18,14). HW,HL,IODc=100,90,58 (=100,90,55). AOD,WAS,IAD=5,3,3.5 (=5,3,4). A3,4,5,12,13=10,10.5,11,8,10 (=10,11,11,8,10). A3=AW×2.2 (=AW×2.0), A12=AW×2.6 (=AW×2.4).

In 1♀ 2♂ specimens from Mindanao the fore tibiae and tarsi are completely yellow. This is quite exceptional.

ON TWO SUBSPECIES OF TACHYTES MODESTUS SMITH

1. Tachytes modestus borneanus Cameron, 1902 (n. stat.)

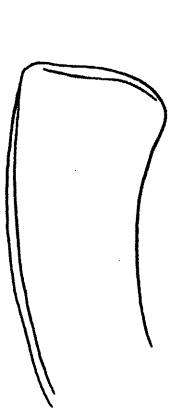
Tachytes borneana Cameron, J. Str. Br. R. Asiat. Soc., 37: 96, 1902 (♀, 13 mm, Borneo, Sarawak, Kuching).
Tachytes borneanus: Pulawski, J. Wash. Acad. Sci., 64 (4): 317, 1975.
Tachytes borneanus: Bohart & Menke, World Sphecid., p. 264, 1976 (listed, Borneo and the Philippines).

According to the original description in borneana the vestiture is silvery. Certainly in 2 ♀ 1 ♂ specimens that are collected in Java and that are identified with this species in my collection the vestiture of the head and thorax is silvery. I took out the the genital organs from the male specimen and could confirm that they are almost completely identical with those of modestus banoensis, differing only in that dorso-apical angle of penis valve is somewhat less produced (Fig. 120) and in dorsal view with sides much less strongly convergent apically (Fig. 121). From modestus typical form, besides the above, it differs in the more rounded median reflected prominence at outer margin of paramere (Fig. 122, in this respect similar to banoensis). ternite 8: Fig. 123, with apical emargination deeper than in banoensis and rather close to that of the typical race.

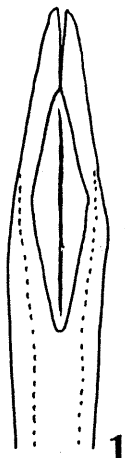
Measurements ♀ (within parenthesis ♂):

HW,HL,IODv,A3=100,45,20,15 (100,46,20,14). HW,HL,IODc=100,85,58 (100,88,58). AOD, WAS,IAD=5,3,4 (5,3,3.5). A3,4,5,11,12(in ♂ 12,13)=10,10,10,7,8 (10,10.5,10.5,7,10).

Remarks. From Borneo another closely resembling species, T. aureocinctus Cameron, 1905, is known, having reddish tibiae and tarsi. But in this species the gastral pile bands are golden and the hair of the female pygidium is silvery. Further, in this species the body is much larger (14–15 mm), IODv is much broader than in the members of modestus and the hind tibia and its longer spur are markedly long and the species is distinctly different in the species rank.

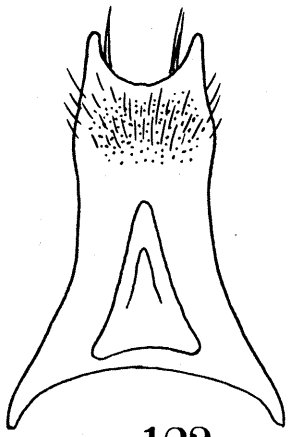


120



121

122



123

2. Tachytes modestus palawanicus Tsuneki, 1976

Tachytes banoensis palawanicus Tsuneki, Steenstrupia (Copenhagen), 4: 48, 1976 (3 ♀ 1 ♂, Palawan, 1 ♂, Balabac).

This subspecies is intermediate in colour of the vestiture of the head and thorax sspp. banoensis and borneanus. It is pale brassy, not so yellowish as in banoensis and not so glittering white as in borneanus.

In my original description of ssp. palawanicus the difference in hhe colour of the legs was also counted, but according to the present confirmation of the variation in colour of the legs in banoensis it seems better to exclude the colouration from the subspecific characters of palawanicus.

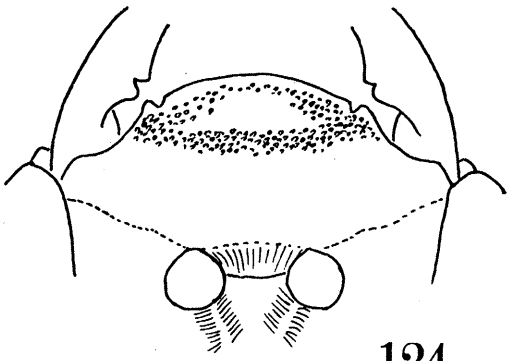
33. TACHYTES BREVICORNIS TSUNEKI, 1976

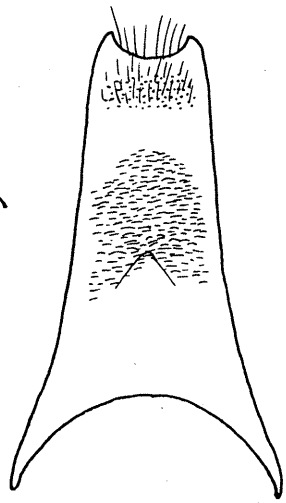
Tachytes brevicornis Tsuneki, Steenstrupia (Copenhagen), 4: 52, 1976 (14 ♀ 1 ♂, Palawan,

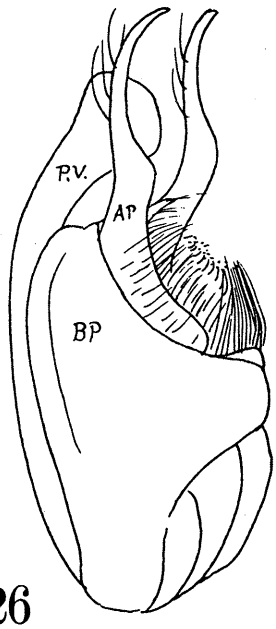
figs. of clypeus and genitalia).

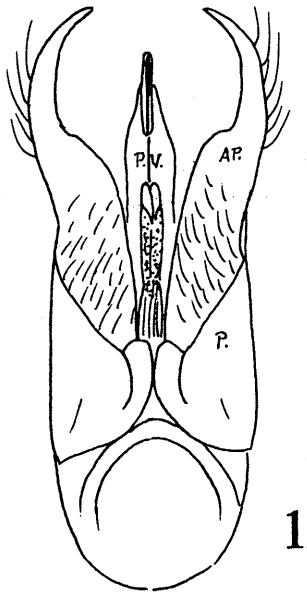
Specimens examined: 3 ♀ 18 ♂, Mindanao, Cagayan de Oro, Opol Beach, 14.VIII.1980 C. Nozaka (2 ♂), T.Tano (2 ♀ 7 ♂), T.Murota (1 ♀ 9 ♂).

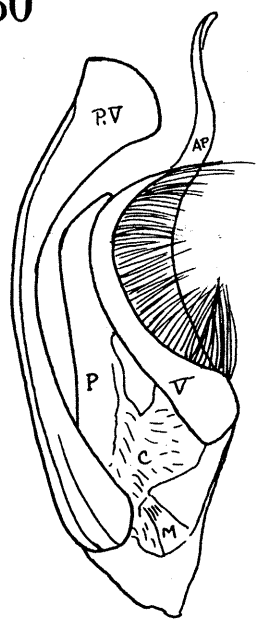
Main characters. ♂. Hair on frons and clypeus distinctly brassy, sometimes golden, on mesoscutum and postscutellum pale brassy, hair bands on gaster sometimes silvery, sometimes pale brassy, hair on other parts of body silvery. Mandible polished and dark reddish brown, at base black and in middle somewhat paler, tegula except antero-inner part translucent yellowish brown, legs from apex of T1 apically ferruginous, on mid and hind ones T2 or T2-3 partly dusky above, tibial spurs and base of T1 also ferruginous, but the spines of tibiae and tarsi white and conspicuous. Wings hyaline, stigma ferruginous, veins dark brown. Clypeus: Fig. 124, sternite 8: Fig. 125. Genitalia characteristic in that apical part (AP) of paramere is apparently separated from basiparamere (BP): Fig. 126 (lateral view). AP is very slender, long, attenuate, curved - somewhat twisted as given in Figs. 127 (ventral) and 128 (inner). Volsella well developed, in lateral view curved, sickle-shaped and densely fringed with long hair on inner (ventral) margin (Fig. 128, V - right half seen from inner side), but in ventral view very fine, almost linear (Fig. 127), that is to say, it is a very thin plate. Penis valve is











Figs. 124-130.

Tachytes brevicornis Tsuneki

124-129 ♂, 130 ♀.

124 and 130 ... clypeus.

125 ... the 8th sternite.

126-129 ... genitalia.

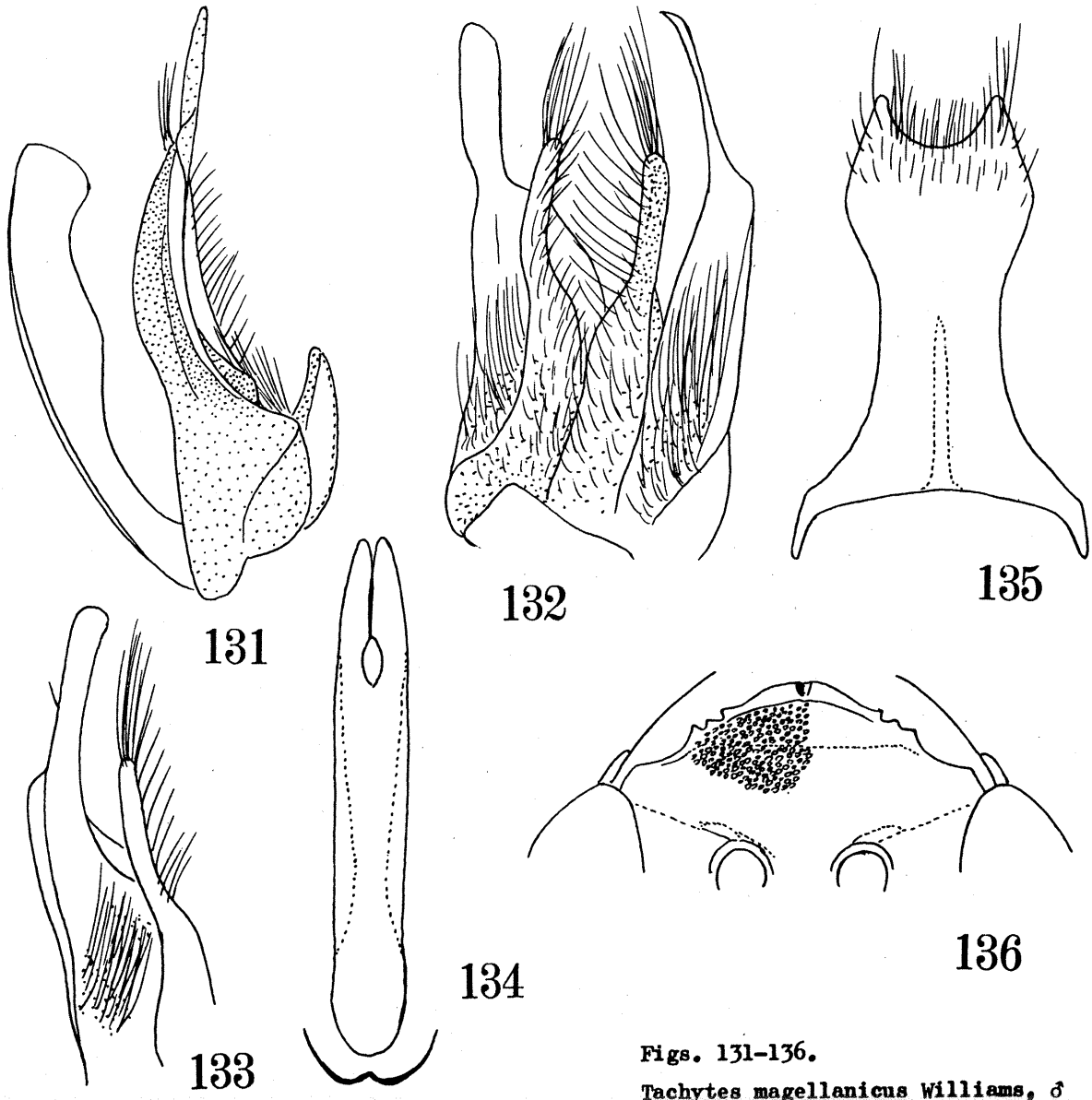
characteristic in form, in lateral view: Fig. 128, in dorsal view: Fig. 129. Measurements: HW,HL,IODv,A3=100,49,20,12. A2+3 relatively 18. HW,HL,IODc=100,87,55. A3,4,5, 12,13=10,10,10,6,10. A3=AW×2. AOD,WAS,IAD=10,6,8. Length increasing order of abscissae of radial vein of fore wing: 5,2,3,1,4, relative length: 1,3,4,5,8 or 1,3,3,4,8.

♀. Similar to ♂ in general. Hair on clypeus, lower frons, pronotal collar, sides of head and of thorax, and on **coxae** and femora silvery, on upper frons always brassy, while on mesoscutum, postscutellum, lateral areas of dorsal and posterior aspects of propodeum and on apical margins of GT1-4 pale brassy, but in some light appears silvery. Ferruginous on tarsi confined mainly to apical 2 joints (in mid leg partly black), other joints only at base and apex narrowly brownish, tibial spurs pale brown, spines of tibiae and tarsi white as in ♂. Clypeus: Fig. 130, bevel distinct, smooth and polished, smooth area further extended posteriorly, apical reflected marginal area narrow, medianly minutely, not strongly incised. HW,HL,IODv,A2+3,A3=100,48,20,18,12 (A2 is measured here from basal constriction apically). HW,HL,IODc=100,44,54. A3,4,5,11,12=10,9.5,9,6, 10. A3=AW×2.2(dorsal) =AW×2(lateral). AOD,WAS,IAD=10,6,7.

Length: ♂ 8.5-9.5 mm, ♀ 9.0-10.0 mm.

34. TACHYTES MAGELLANICUS WILLIAMS, 1928

Tachytes magellanica Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 91, 1928



Figs. 131-136.
Tachytes magellanicus Williams, ♂

(3 ♀ 3 ♂, Luzon, Panay, Sibuyan).

Tachytes magellanicus: Bohart & Menke, World Sphecid., p. 265, 1976 (listed).

Specimen examined: 1 ♂, Mindanao, Zamboanga, Pasonanca Park, 30-31.VII.1980, K. Sabi.

Remarks. The present specimen agrees well with the description and figures of Williams (1928), especially so in the form of the clypeus. His figure of the genitalia is in ventral view and without hair, so some supplements will be given:

Genitalia in lateral view (penis valve is moved backwards): Fig. 131, in ventro-lateral view: Fig. 132 (from right side, penis valve is omitted), left paramere and volsella seen from more ventral side: Fig. 133, penis valve in dorsal and in vertical view: Fig. 134. The genitalia are characteristic in the comparatively small prominence located at base of outer margin of the apical part of paramere (Figs. 131 and 132). Sternite 8 is also characteristic in it form (Fig. 135). Measurements of the specimen:

HW,HL,IODv,A2,A3=100,48,18,2.5,8 (A2 is measured from basal constriction apically, if measured from extreme base of black chitinized area it reaches amply 3.5). HW,HL,IO IODc=100,90,61. A3,4,5,12,13=10,11,10.5,8,12. A3=AW×2.3. AOD,WAS,IAD=10,5,8.

The male of this species can be separated from the closely allied other species by the combination of the following characters: Wholly black tarsi (spurs and spines brown), nearly completely black mandible (medianly feebly brownish), the form of apical margin of the clypeus (Fig. 136), medianly weakly furrowed scutellum. Tegula of fore wing on anterior half black and on posterior half translucent brown and at the centre a large yellow mark is seen. This is the white part of the extreme base of the basal plate of the wing. Length of the specimen is 11.5 mm. Wings very slightly clouded all over, without particular darkening at the apex.

35. TACHYSPHEX NOVARAE (SAUSSURE, 1867)

Tachytes novarae Saussure, Reise osterr. Fregatte "Novara" um die Erde, Zool. Hym., p. 69, 1867 (♀, Nicobar Is.).

Tachytes (Tachysphex) Novarae: Kohl, Verh. zool.-bot. Ges. Wien, 34: 405, 1884 (with syn. Tachytes obesa Kohl, 1883)

Tachysphex novarae: Tsuneki, Steenstrupia (Copenhagen), 4: 54, 1976 (1 ♀, Palawan, 1 ♂, Balabac, redescr. figs.).

Tachysphex novarae: Bohart & Menke, World Sphecid., p. 275, 1976 (listed).

Tachysphex novarae: Pulawski, Polsk. Pism. Ent., 47: 300, 1977 (♀ ♂, redescr. figs., geogr. varr.)

Tachysphex novarae: Tsuneki, SPJHA, 19: 34, 1982 (2 ♂, Bismarck Arch., redescr., figs.).

Specimens examined: 30 ♀ 59 ♂:

10 ♀ 9 ♂, Mindanao: 2 ♀ 3 ♂, Zamboanga, 1-2.VIII.1980, T.Murota(2♀2♂), T.Tano (1♂); 8 ♀ 6 ♂, Cagayan de Oro, Opol beach, 14.VIII.1980, T.Tano(2♀1♂), T.Murota(6♀5♂).

6 ♀ 4 ♂, Negros: 6 ♀ 3 ♂, Mambucal, 2-3.IV.1979, C.Nozaka(1♂); 1 ♂, Taytay beach, 4-5.IV.1979, T.Tano.

7 ♀ 25 ♂, Cebu: 2 ♂, Danao City, 29.III.1979, H.Kurokawa; 2 ♀ 5 ♂, Cantabaco, 30.III.1979, T.Tano(1♀3♂), H.Kurokawa(1♀2♂); 5 ♀ 20 ♂, Argao, 31.III.1979, T.Tano(3♀9♂) C.Nozaka(2♀9♂).

1 ♀, Leyte, Dulag, 28.III.1978, J.Kojima.

7 ♀ 20 ♂, Luzon: 2 ♂, Baguio, Mines View Park, 26.III.1978, T.Tano; 4 ♀ 11 ♂, Prov. Laguna, San Fernando, 27.III.1978, T.Tano(2♀5♂), C.Nozaka(1♂), T.Murota(2♀5♂); 2 ♂, Prov. Laguna, Pagsanjan, 1.IV.1978, T.Tano; 3 ♀ 3 ♂, Prov. Camarinessur, Naga City, Calabanga, 15.VIII.1978, T.Murota; 2 ♂, Prov. Launion, Naguilian, 1.IV.1980, T.Murota.

On some characters of the Philippine specimens:

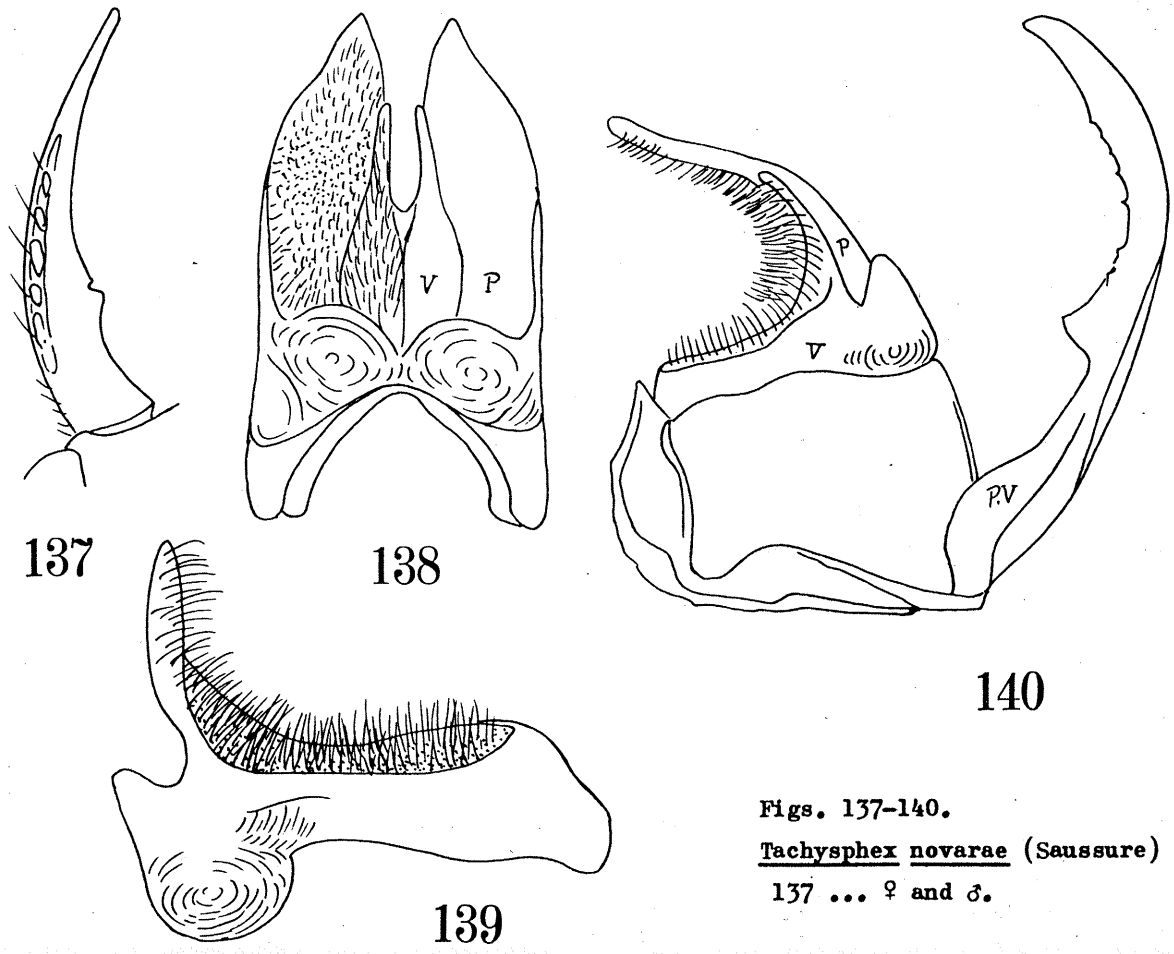
Measurements of ♀ ♀ (within parenthesis ♂ ♂):
HW:IODv=100: 32,30,30,31,30 (=100: 30,30,31,30,31).
IODv:A2+3=10: 6,6,6,6,6 (=10: 6,6,5.7,6,6). A2 here full length of chitinized area.
IODv:IODc=10: 20,20,20,20,21 (=10: 19,18,19,19,16*) * very small specimen.
IODv:CML=10: 12,12,12,13,12 (=10: 10,10,10,10,9.5).
CML:CLL=100: 43,40,40,40,40 (=100: 65,57,60,60,55).
Relative length of A2,3,4,5 when A3=10: 6,10,12-13,11-12 (8,10,13-14,13-14).
Length of the specimens ♀ 8.5-10.5 mm, ♂ 5.5-8.5 mm.

Hair on vertex soft, long, rather sparse, about 3-4 times (♀) or 4-5 times (♂) fore-ocellar-diameter (=FOd) long; on mesoscutum, as pointed out by Pulawski, ground

hair short, somewhat stiff, half appressed and close, 2-3 times FOd long, mixed with sparse, long, soft and erect hair which is 4-5 times FOd.

The present species is very characteristic in its very slender and long mandible (Fig. 137, ♀ ♂) which is in frontal view when well opened 5.5-6 times as long as maximum width at basal inner tooth. The form of clypeus (♀ ♂) is as given by Pulawski (1977, p. 301) and myself (1976, p. 56 and 1982, p. 35 - ♂). Rake bristles of fore tarsus comparatively short, stiff and widely spaced as illustrated by myself (1976) and by Pulawski (1977) and dark brown in ♀, somewhat less stiff and whitish in ♂. All T4 short, almost or completely without apical incision (♀) or with a broad obtuse incision (♂), T5 without basolateral angle, smoothly widened apically, apical margin of ventral surface with a lamellate prominence, semicircular in middle in ♀ and broad and gentle in ♂, posterior margin with a few short spines in ♀, unarmed in ♂. Hair on propodeal dorsum soft, vertically erected or inclined latero-posteriorly, dorsum with strong and complete lateral carinae. Vertex covered with medium-sized, shallow and sparse piliferous punctures, PIS delicately microcoriaceous, half-mat, punctures on ocellar area and on frons similar in size, somewhat stronger and on frons closer, PIS on ocellar area weakly but on frons more strongly microcoriaceous, surface nearly mat (♀ ♂). Punctures on mesoscutum in ♀ medium-sized, on lateral and medial areas close, sometimes subcontiguous, usually PIS somewhat narrower than PD, on intermediate areas sparse, PIS 1-3 times PD, always PIS regularly microcoriaceous; in ♂ general pattern similar, but punctures stronger and generally closer and sparse area narrower, on close area almost always subcontiguous, microreticulation on PIS stronger and surface much less shining than in ♀. Scutellum in ♀ and ♂ with punctures sparser than on scutum and PIS without microsculpture, smooth and shining. Punctures on episternum of mesopleuron somewhat sparser than on scutum, with microreticulation stronger, but on epimeral area punctures weaker and indistinct (♀ ♂).

The genital organs of the male (24 examples are examined) are characteristic in that paramere is comparatively broad, tapering apically, with ventral surface densely covered with soft pubescence (Fig. 138 - ventral view, penis valve omitted), hair on in-



Figs. 137-140.
Tachysphex novarae (Saussure)
137 ... ♀ and ♂.

ner margin of volsella is also soft, comparatively long and close (Fig. 139), penis valve long and curved, provided with a large tooth on inner margin at base of apical area, and the margin beyond the tooth very minutely serrate (Fig. 140, left half seen from inside) as in the specimen from the Bismarck Is., not smooth as given by Pulawski (1977, p. 301).

36. TACHYSPHEX LAGUNAENSIS SP. NOV.

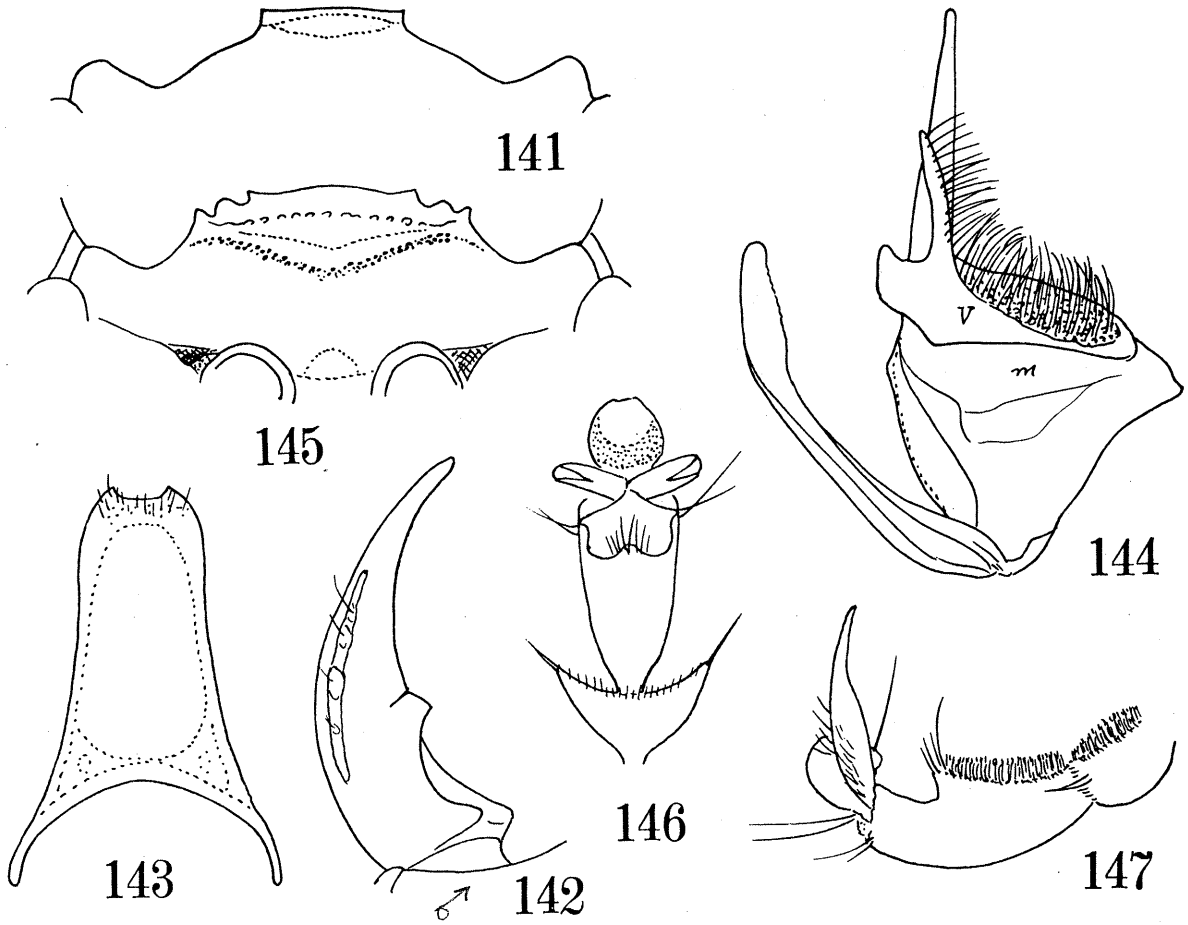
Similar in the propodeal hair to novarae, but that of vertex short, of mesoscutum uniform and short, clypeus different in form (♀ ♂), mandible relatively shorter and wider, PIS of mesothorax without microsculpture, well shining, T4 about as long as wide and deeply, acutely incised at apical margin, fore tarsi of male without rake bristles, apical margin of ventral surface of T5 with a weak indistinct prominence in ♀, simply and gently rounded out in ♂, both without short spines on lateral margins. In male genitalia paramere slender, without dense pubescence on ventral surface, only sparsely fringed with hair on ventral margin seen in profile, penis valve without a large tooth on ventral margin at apical area, only very minutely serrate.

♂. Length 5.5–6.5 mm. Black; mandible glossy black, apically and on inner margin somewhat dark red, tegula broadly brown and translucent, on inner margin dark, legs apically slightly brownish, fore tibial spur and all claws brown, rest of spurs brownish black, while spines white, with a slight tint of brownish; wings slightly clouded, veins dark brown – black, in hind wing more distinctly brownish. Hair silvery on lower frons and clypeus, thick, close and appressed, on other areas fine, rather soft, silky white, on vertex erected, not dense, about 1–1.5 times FOd, on mesoscutum similar, but half inclined, uniform, without long sparse erect hair mixed, on propodeal dorsum soft, vertically erected or inclined postero-laterally. Pile bands on gaster on GT1-3 present, not marked.

HW:IODv=100:23. IODv:A2+3=10:8 (A3=5). IODv:IODc=10:25. IODv:CML=10:7. CML:CLL =10:13. A2,3,4,5=7,10,11,12. A3=AW×2. Glittering bottom line of central impression of vertex Y-shaped, posterior arm reaching middle of post-ocellar elevation, elevation of ocellar area somewhat stronger than in novarae, with median furrow more distinct, especially on anterior portion, supra-antennal shining tubercles as in novarae, clypeus: Fig. 141, disc gently raised towards median line, with hairs convergent towards it, bevel lunate in form, obliquely inclined, sometimes with surface more or less depressed. Mandible: Fig. 142, much robuster and thicker than in novarae (cf. Fig. 137), about 4 times as long as wide at maximum, with ventral incision as in this. Structure of thorax generally as in novarae, but scutellum with a round shallow impression medio-posteriorly; propodeum without lateral carinae, but sometimes carinae of coarse reticulation of dorsum or the uppermost one of the striae of the sides appearing to be a part or whole of the lateral carinae (sculpture at lateral part of dorsum considerably variable). Basal incision of fore femur with basal margin triangularly highly raised, but the elevation without lateral carinae margining the incision and incision itself without medial carina; tarsus without rake bristles, T5 about as long as wide, deeply and acutely incised at apex. Abscissae of fore wing radial vein are in the following increasing order in left wing of 9 specimens: 5,3=1≒2,4. 5,3,1≒2,4 (in two ex.). 5,1,3,2,4. 5,1=2,3,4. 5,1=3,2,4 (in two ex.). 5,2,3,1,4. 5,3,1,2,4. That is to say, 5 is always shortest and 4 is always longest and 1,2,3 are subequal in length and intermediate between 5 and 4, only slightly different variably without significance.

Sternite 8: Fig. 143. Dissected right half of genitalia seen from inside: Fig. 144 (V volsella, m membraneous white tissue). In general pattern similar to novarae, but dorsal prominence of volsella narrower and more angulated and penis valve without basal tooth on apical area.

Vertex moderately finely, fairly closely punctured, PIS≒PD and partly somewhat smaller than PD, sometimes without microreticulation and smooth and polished, sometimes microcoriaceous, but not strongly so, with surface fairly shining, raised ocellar area similar in punctation, its median furrow weakly foveolate, punctures on frons similar in size but shallower, sometimes indistinct in outline, mostly PIS≒PD, but sometimes punctures much closer, PIS always strongly microcoriaceous, mat or half mat; punctures on mesoscutum similar in size, but usually closer, with PIS mostly without microstriae and shining, only rarely feebly microcoriaceous, the scutum at posterior margin always strongly crenate, scutellum more sparsely and more finely punctured than on scutum, with PIS shining, mesopleuron similarly but more weakly punctured, with PIS smooth and polished. Sculpture on propodeal dorsum much coarser than in novarae, at base longitudinally, on the rest irregularly and coarsely rugoso-reticulate, on lateral areas the



Figs. 141-147. Tachysphex lagunaensis sp. nov.

sculpture sometimes particularly stronger, posterior aspect transversely and coarsely rugoso-striate, striae-intervals not smooth, sides longitudinally, somewhat obliquely, strongly and coarsely striate, with interspaces smooth and shining, without puncture (in novarae propodeal sides fairly closely punctured and mixed with sparse weak striae that run mainly oblique). Gaster covered with very fine micropoints, barely observable under 70× magnification, on GT somewhat close and on GS somewhat sparser, but on GT5 a few fine but distinct punctures present near apical margin, the punctures on GT6 somewhat stronger and more numerous and on GT7 fairly strong and close, spreading all over uniformly, on apical margins of GS4-7 one or two strong hair-bearing punctures present on each side.

♀. Length about 9 mm. Similar in colour to ♂, fore tarsal comb long and white, close, partly bundled together.

HW:IODv=100:23. IODv:A2+3=10:9 (A3=5.5). IODv:IODc=10:26. IODv:CML=10:14. CML:CLL=10:5.5. A2,3,4,5=7,10,11,11. A3=AW×2.3. Structure of vertex, ocellar area and frons as in ♂. Clypeus: Fig. 145. Mandible as in ♂, 4 times as long as width at its maximum. Dorsum and posterior aspect of propodeum similar in length in lateral view, forming an angle of about 120°, pygidial area with apex comparatively broadly truncate, surface on apical area distinctly punctured with comparatively large elongate punctures. Hind T5: Figs. 146 (ventral) and 147 (lateral), without spine on ventral surface.

Punctures and microsculpture on head as in ♂ (in this specimen PIS on vertex weakly microstriate), mesoscutum closely punctured, with PIS feebly microstriate, posterior margin crenate as in ♂, scutellum with a small impression as in ♂, with surface finely, sparsely punctured and PIS shining, mesopleuron and propodeum punctured and sculptured as in ♂. Punctures on gaster also similar, but without gross punctures on posterior GTs, on GS similar.

Holotype: ♂, Luzon, Prov. Laguna, Pagsanjan, sandy area, 1.IV.1978, T.Tano (Coll. Tsuneki).

Paratypes: 1 ♀, Negros, Taytay beach, 4-5.IV.1979, T. Tano; 7 ♂, collected with the holotype, T.Tano(5♂), T.Murota(2♂). 1 ♂, Luzon, near Baguio City, Naguilian, 28.III.

1978, C.Nozaka.

Remarks. In the Pulawski's key (1977) the present species (♀ ♂) runs to Tachysphex fortior Turner, with a slight inconsistency on the way, but differs from this at least in the form of clypeus (♀ ♂), volsella and penis valve (♂) and in the structure of T5 (♀).

37. TACHYSPHEX CHANGI LUZONICUS SSP. NOV.

Tachysphex changi Tsuneki, 1967:

Tachysphex changi Tsuneki, Etizenia, 20: 53, 1967 (1♀2♂, Formosa, figs. clypeus, mandible, pygidium, genitalia, GS8 etc.).
Tachysphex changi : Tsuneki, Ibid., 55: 20, 1971 (5♂, Ryukyus); -: Haneda, Life Study, 15(1-2): 30, 1971 (1♀, Formosa); Ibid., 16(1-2): 4, 1972 (1♀, Formosa); -: Tano, Ibid., p. 24, 1972 (5♂, Ryukyus).
Tachysphex nambui Tsuneki, Etizenia, 65: 5, 1973 (1♀, Ryukyus)(SYN. NOV.); SPJHA, 23: 60, 1982 (listed).
Tachysphex changi: Bohart & Menke, World Sphecid., p. 273, 1976 (listed).
Tachysphex nambui: Bohart & Menki, Ibid., p. 275, 1976 (listed).
Tachysphex changi: Krombein, Spolia Zeylanica, 35(1-2): 123, 1981 (Sri Lanka).

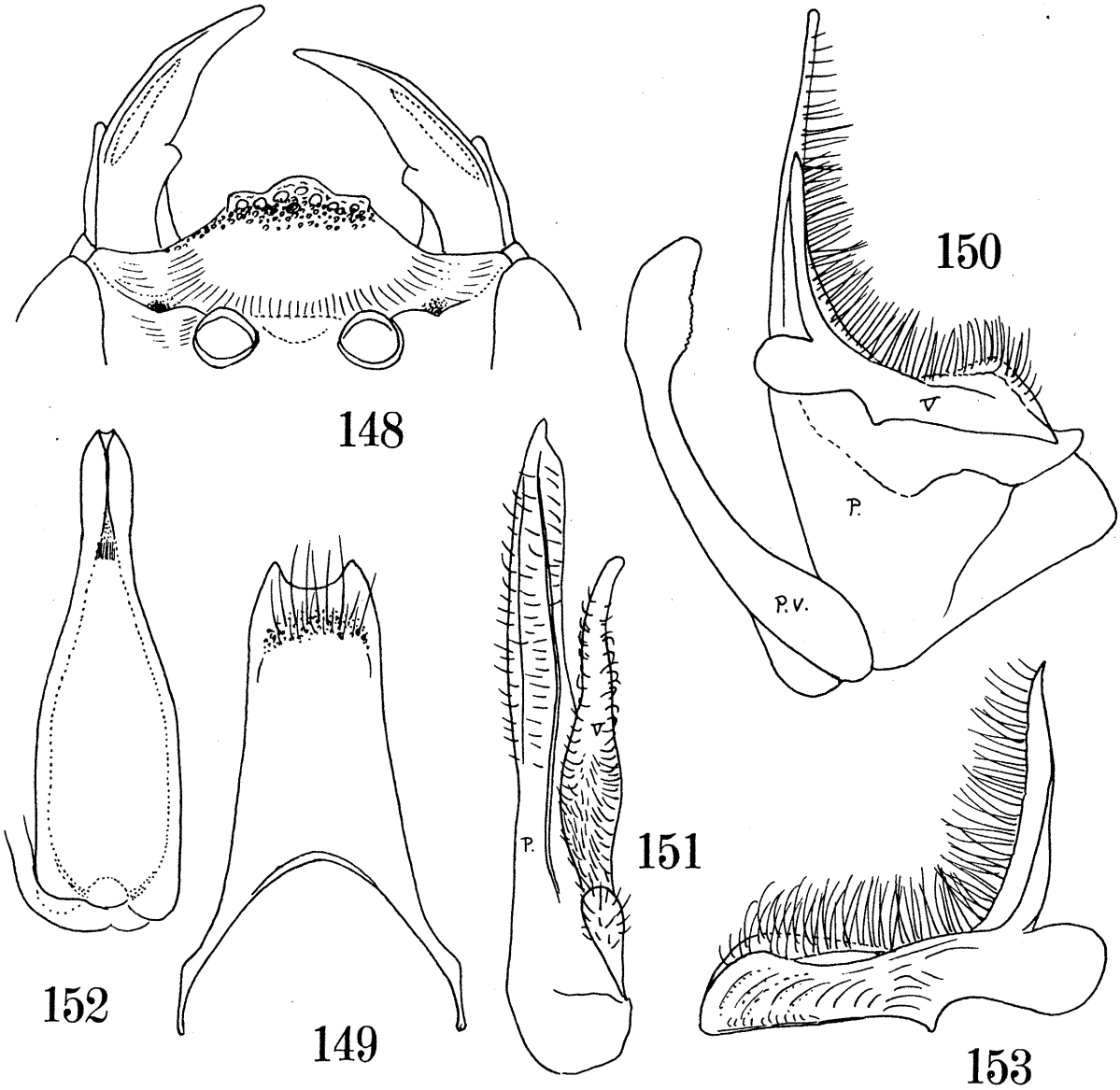
SSP. LUZONICUS SSP. NOV.

The Philippine subspecies of T. changi differs from the nominate form of Formosa and the southern Ryukyus mainly in that the medio-apical margin of clypeus is distinctly roundly produced and that the body size is much smaller.

Main characters: Hair on propodeal dorsum soft, erect, on mesoscutum uniform, short and appressed, T4 about half the length of T3, deeply and acutely notched apically, IODv less than half IODc, inner orbits sinuate, on lower portion almost parallel, mandible thick, short and notched beneath, hair on lower frons and clypeus golden or brassy, propodeum without lateral carinae, with medial carina indistinct or lacking; apical part of penis valve without large tooth on ventral margin, but the margin minutely serrate, paramere slender, with medio-dorsal flat prominence large and rounded.

Description. ♂. 7-8 mm. Black; mandible in frontal view medianly ferruginous, palpi dark brown, with apical one or two joints pale, tegula translucent brown, wing veins dark brown, legs apically somewhat brownish, tibial spurs and spines brown; wings hyaline, apically slightly clouded. Hair on lower frons and clypeus golden or brassy, U-shaped pile band on mesoscutum usually silvery, but sometimes brassy, hair on other areas silvery or silky white, partly appears greyish white in some light, pile bands on gaster on GT1-3, silvery.

HW,HL,IODv,A3=100,44,16,10. IODv,A2+3,IODc,CML=10,10,28,9.5. AOD,WAS,IAD=8,5,7. CML:CLL=10:11. A2,3,4,5,12,13=7*,10,11.5,12,9,12. (* Full length, from constriction 6). A3=AW×1.8. In fore wing abscissae of radial vein 1,2,3,4,5=7,8,4,19,2; in one other = 6,7,6,19,2 (thus considerably variable), relative length of tarsal joints when fore T1 is 20: In fore T1,2,3,4,5=20,9,6,5,11, in mid leg 21,13,9,5,11 and in hind leg 24,16, 10,5,11. T2 very obtusely, T3 somewhat distinctly and T4 fairly deeply and acutely incised at apex. Fore femoral excavation without medial carina, fore T1 without rake bristles. IODv much narrower than in novarae, post-ocellar V-shaped impression much more anteriorly located and the angle of V much acuter, post-ocellar area that is enclosed with this furrow not so raised as in novarae and ante-ocellar rounded elevation slightly higher and more distinct in outline; frons in middle without furrow, but finely carinated, supraantennal smooth tubercles as in novarae. Inner orbits in frontal view sinuate and on anterior portion subparallel; clypeus: Fig. 148, disc gently roundly raised, apical margin of median lobe with lateral corners right-angled and sometimes strongly reflected, with median area broadly roundly produced, the produced area roundly inclined anteriorly and smooth, polished, and at base sometimes with a transverse series of gross punctures (but inconstant). Labrum not strongly produced, apically gently bilobate, mandible very thick and relatively short (in Fig. 148), seen in front outer margin obtusely bent near middle. Propodeum without lateral carinae, medial carina also usually lacking, in lateral view dorsal and posterior margins subequal in length, forming an angle of about 105°, angle nearly pointed, that is to say, posterior aspect subtruncate. GT7 with surface flat, rather slightly concave, not enclosed with carinae, closely covered with medium-sized rounded shallow punctures. Sternite 8: Fig. 149 (ventral or external view), dissected right paramere and volsella with penis valve seen from inside: Fig. 150, left



paramere and volsella seen from beneath: Fig. 151, penis valve in dorsal view: Fig. 152, in lateral view: in Fig. 150 (P.V.), left volsella seen from inside: Fig. 153.

Vertex behind V-shaped impression finely, somewhat sparsely punctured, PIS≒ or> PD and delicately microcoriaceous, surface of ocellar area similar, but laterally with punctures much sparser, frons more closely punctured and PIS microcoriaceous; mesoscutum slightly more finely and mode closely punctured than on head, with microsculpture on PIS weaker, mesopleuron more strongly and more closely punctured, even on epimeral area. Dorsum of propodeum coarsely and irregularly rugoso-reticulate, longitudinal rugae confined to narrow basal area only, posterior aspect transversely rugoso-striate, intervals filled with large, shallow, weak and indistinct punctures, sides longitudinally, posteriorly obliquely, distinctly and closely striate, punctures on intervals much weaker than in novarae. Gaster on dorsal side except GT7 very finely and closely, on ventral side more largely and sparsely punctured.

♀, still unknown.

Holotype: ♂, Luzon, Prov. Laguna, Los Banos, Botanical Garden, 30.III.1978, T.Murota leg. (Coll. Tsuneki).

Paratypes: 1 ♂, Los Banos, valley of Mt. Makiling, 29.III.1978, T.Murota; 2 ♂, same data with holotype; 5 ♂, Prov. Laguna, Alaminos, Hidden Valley Spring, 3-4.IV.1978 T.Murota; 1 ♂, Asin Spa, 16 km from Baguio City, about 600 m high, 2.I.1980, T.Murota.

Remarks. Measurements of typical race from Formosa, ♂ (within parenthesis ♀): HW,HL,IODv,A3=100,47,18,12 (=100,46,20,12). IODv,A2+3,IODc,CML=10,10,26,7 (=10,10,

26,15). AOD,WAS,IAD=16,10,14 (=17,10,14). CML:CLL=10:16 (=10:5). A2,3,4,5,12,13 in ♀ 11,12)=7,10,12,12.5, 8.5,11 (=6.5,10,11.5,12,8,9). A3=AW×1.8 (=AW×2.2). Abscissae 1,2, 3,4,5=10,10,6,26,2(left); 11,9,6,26,2(right) (=8,8,8,15,2(left); 7,7,8,15,2(right). Relative length of tarsal joints when fore T1 = 20: In fore 20,9,6,5,11 (=20,10,6,4,10); in mid 21,13,7,4,10 (=20,13,7,4,10); in hind 22,15,10,5,10 (=22,17,10,4,10). T2 weakly and obtusely, t3 distinctly, T4 fairly deeply, broadly and acutely incised at apex, fore T1 without rake bristles. Claws prehencile.

38. TACHYSPHEX PUNCTICEPS CAMERON, 1903

Tachysphex puncticeps Cameron, Trans. Ent. Soc. London, 1903, Pt. 1: 127, 1903 (♀, India, Barrackpore).

Tachysphex puncticeps: Pulawski, J. Wash. Acad. Sci., 64(4): 311, 1974 (Syn.: varihirta Cameron, 1903 - India; rugidorsatus Turner, 1915 - Tasmania; mindorensis Williams, 1928 - Philippines).

Tachysphex mindorensis Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 92, 1928 (4 ♀ 2 ♂, Mindoro, Negros, Luzon, figs. clypeus and genitalia).

Tachysphex mindorensis: Tsuneki, Etizenia, 55: 14, 1971 (9♀3♂, Formosa, figs. ♀, clypeus, pygidium, fore tarsus; ♂, GS8, fore tarsus, paramere & volsella, penis valve).

Tachysphex mindorensis: Haneda, Life Study (Fukui), 16(1-2): 4, 1972 (1♀, Formosa).

Tachysphex mindorensis: Tsuneki, Steenstrupia (Copenhagen), 4: 54, 1976 (17♀9♂, Philippines: TawiTawi).

Tachysphex puncticeps: Bohart & Menke, World Sphecid., p. 276, 1976 (listed, syn.)

Tachysphex puncticeps: Pulawski, Polsk. Pism. Ent., 47: 215, 1977 (redescr. variat. w. figs. clypeus ♀♂, hind T4,5 ♀, volsella, penis valve).

Specimens examined (all well prepared, with mandibles opened, with genitalia exposed). 5 ♀ 1 ♂, Luzon: 1♀1♂, Pr. La Union, St. Fernando, 27.III.1978, C.Nozaka(1♂), T. Murota(1♀); 2♀, Pr. Laguna, Los Banos, Mt. Makiling valley, 29.III.1978, T.Tano(1♀), C. Nozaka(1♀); 1♀, Los Banos, village, 31.III.1978, T.Tano; 1 ♀, Pr. Laguna, Alaminos, Hidden Valley Spring, 3-4.IV.1978, T.Tano.

2 ♀ 1 ♂, Cebu: Argao, 31.III.1979, T.Tano(1♀); H.Kurokawa(1♀); Danao, 29.III.1979 C.Nozaka(1♂).

1 ♀ 2 ♂, Negros: 1♀1♂, Mambucal, 2-3.IV.1979, C.Nozaka; 2♂, Taytay beach, 4-5. IV.1979, T.Tano & H.Kurokawa.

4 ♀, Mindanao: 3♀, Zamboanga, Pasonanca Park, 30-31.VII.1980, K.Sabi(1♀), Bolong beach, 1.VIII.1980, T.Tano(1♀), H.Kurokawa(1♀); 1♀, Cagayan de Oro, Opol beach, 14.VIII. 1980, T.Murota.

On some characters. (ref. Williams, 1928, p. 92; Tsuneki, 1971, p. 14; Pulawski, 1977, p. 215).

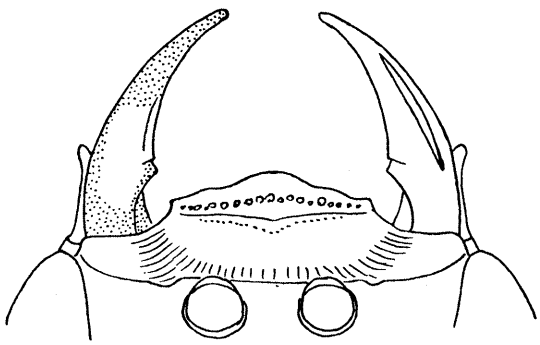
(1) Apical margin of clypeus. ♀. Apical margin more or less varied in form (cf. Figs. 154 - 163). In the Philippine specimens the median produced area almost always with a minute incision near lateral ends and the remaining area sometimes markedly, sometimes feebly trilobate, each lobe sometimes similar in form, but usually the median lobe more or less broader and always slightly advanced. (Fig. 154 Cebu, 155 Negros, 156-159 Mindanao, 160-163 Luzon). ♂ (cf. Figs. 164, Cebu, Negros and Luzon; 165, Negros). Fig. 164 is the usual feature, in one of the Negros specimens posterior margin of the bevelled area is acutely edged - Fig. 165.

(2) Mandible. ♀ ♂. Usually slender and long, but in one of the Cebu specimens markedly robust (Fig. 166), though it is considerably rubbed down. In the specimen captured near Hidden Valley Spring, Luzon, it is slightly widened than usual, though apical half normally curved evenly on inner margin. Mandible is medianly broadly bright ferruginous as given in the left one of Fig. 154, one of the characters of the species.

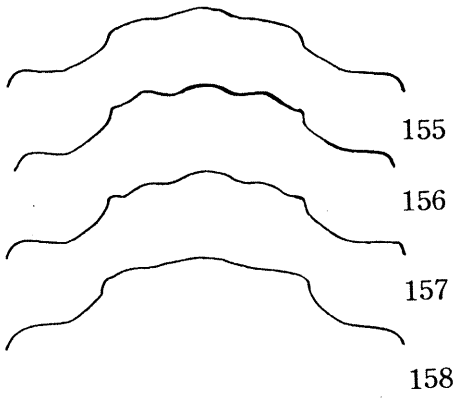
(3) Rake bristles on outer side of fore tarsus. In ♀ well developed, long, curved and white, only apically shortly somewhat brownish. On TI basal 2 or 3 bristles not long, separated and spaced, but apical 4 more closed and frequently bundled together, on TII 3, on TIII and TIV each 2 bristles usually bundled and apically gradually shorter. In ♂ without rake bristle (cf. Tsuneki, 1971, p.14, Fig. 55).

(4) Hair on dorsal side. On vertex short, slightly longer than FOd, soft and erected; on mesoscutum as long as, or slightly longer than FOd, appressed posteriorly, on propodeum half erected and distinctly inclined forwards or obliquely forwards.

(5) Epipygium. Pygidial area and its punctation in ♀ as in Formosan specimens (cf. Tsuneki, 1971, p. 14, Fig. 54). GT7 in ♂ medianly more finely, more weakly, indis-



154

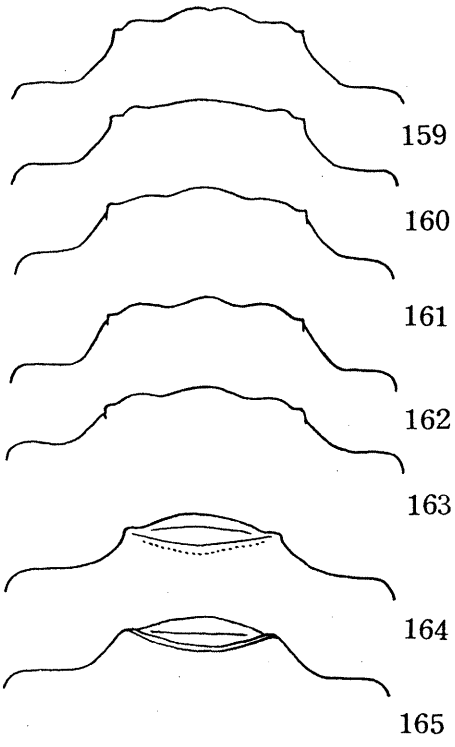


155

156

157

158



159

160

161

162

163

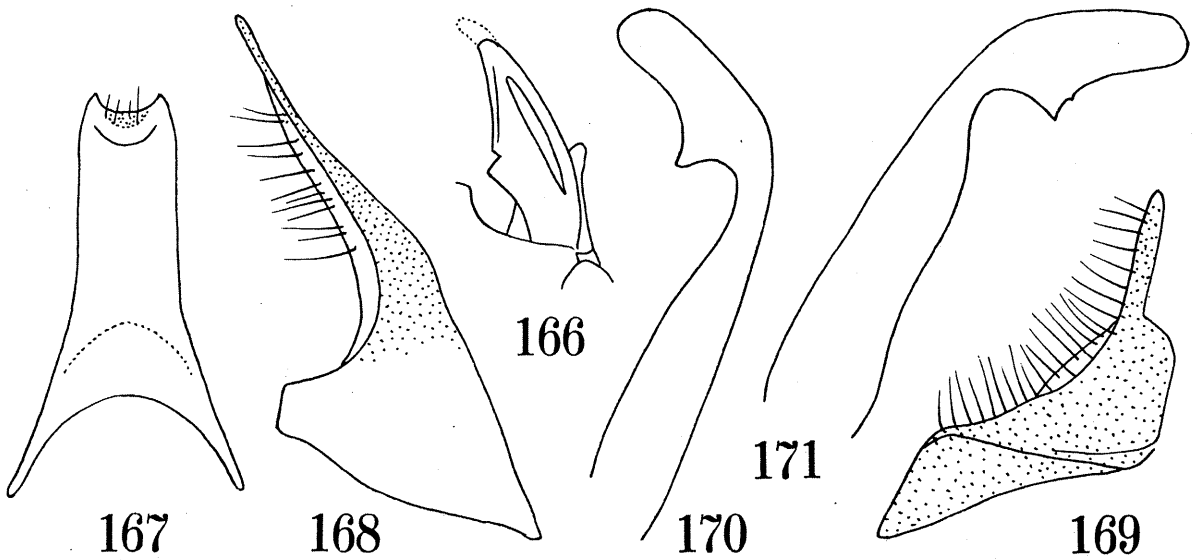
164

165

tincly and somewhat more sparsely punctured than on lateral areas, with apical marginal area slightly reflected.

(6) Sternite 8. Main part with longer parallel-sided area than in the Formosan specimens and apical part less strongly convergent (Fig. 167, cf. Tsuneki, 1971, Fig. 56).

(7) Male genitalia. Paramere with apical area very slender and long, sparsely fringed with hair on ventral margin (Fig. 168), volsella (Fig. 169) as given by Pulawski (1977) and myself (1971), penis valve in the Philippine specimens as well as the Formosan representatives is not so acutely narrowed towards apex as shown by Pulawski (1977), but always with apex broadly rounded. If this difference is correct and constant it seems to me that mindorensis may be a different species from puncticeps. Usually the penis valve is provided with a large tooth on inner margin at base of apical area (Fig. 170), but rarely with an additional small tooth beyond it (Fig. 171).



166

171

167

168

170

169

(8) Sculpture and punctation. ♀ ♂. Vertex covered with medium-sized punctures, PIS=PD or slightly narrower and without microsculpture, shining, frons minutely subreticulate, subcarinate PIS microstriate or microcoriaceous (in the Formosan specimens always smooth and shining), mesoscutum finely, closely punctured, punctures on mesopleuron slightly sparser, on epimeral area weaker in addition, on both PIS without microsculpture, shining. Propodeum (without lateral carinae) on dorsum at base longitudinally rugoso-striate, thence posteriorly comparatively finely rugoso-reticulate, on postrrior aspect mainly transversely and closely rugoso-striate, on sides obliquely (nearer to longitudinal than to transverse), closely striate, with interspaces of striae shining.

Length ♀ 5-7 mm, ♂ 5-6 mm.

Measurements (within parenthesis ♂): HW,HL,IODv,A3=100,50,20,13 (=100,54,25,8). IODv:A2+3=10:11 (=10:6.5). IODv,IODc,CML=10,29,15 (=10,22,9). CML:CLL=10:6-6.5 (=10:8-9). HW:HL in frontal view =100:90 (=100:88). AOD,WAS,IAD=19,10,9 (=20,10,10). A2,3,4,5,11(12),12(13)=6,10,11,12,7,10 (=12,10,12,12,14,19). A3=AW×2.2 (=AW×1.2). Abscissae of rad al vein of fore wing from short to long = mostly 5-3-1-2-4 (relative length considerably varied).

39. TACHYSPHEX TINCTIPENNIS CAMERON, 1904

Tachysphex tinctipennis Cameron, Ann. Mag. Nat. Hist., Ser. 7, 13: 301, 1904 (♀, N. India).

Tachysphex bengalensis: Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 92, 1928 (♀ ♂, Philippines) (syn. after Pulawski, 1974).

? Tachysphex bengalensis: Krombein, Proc. Hawn. Ent. Soc., 13(3): 382, 393, 1949 (Mariana, Caroline).

Tachysphex lihyuetanus Tsuneki, Etizenia, 55: 15, 1971 (1 ♂, Formosa, 7 figs.) (SYN. NOV.).

Tachysphex tinctipennis: Pulawski, J. Wash. Acad. Sci., 64(4): 311, 1974 (syn.: bengalensis: Williams, nec Cameron).

Tachysphex tinctipennis: Bohart & Menke, World Sphecid., p. 277, 1976 (India, China).

Specimens examined: 21 ♀ 30 ♂, Luzon; 6 ♀ 33 ♂, Negros; 1 ♀ 2 ♂, Cebu; 1 ♀ 6 ♂, Mindanao:

Luzon. (Prov. Laguna) 5 ♀ 7 ♂, Pagsanjan, 1-2.IV.1978, T.Tano(1♀4♂), T.Murota(3 ♀3♂), 7-9.VIII.1978, T.Murota(1♀). 5 ♀ 3 ♂, Los Banos (Botanical Garden, Village, Mt. Makiling), 29-31.III.1978, T.Tano(1♀1♂), T.Murota(2♀2♂); 2-5.VIII.1978, H.Kurokawa(2♀). 5 ♀ 4 ♂, Alaminos, Hidden Valley Spring, 3-4.IV.1978, T.Tano(2♀2♂), T.Murota(3♀2♂). (Prov. Launion) 1 ♀ 10 ♂, Baguio, Naguilian, St.Fernando, Asin Spa, 27.III.1978, T.Tano (3♂), T.Murota(3♂), 26.XII.1979-4.I.1980, T.Murota(1♀4♂). (Prov. Camarinessur) 3 ♀ 2 ♂, Baao and Bato, 16.VIII.1978, C.Nozaka(1♀1♂), T.Murota(2♀1♂). (Prov. Albay) 1 ♂, Tabaco, 19.VIII.1978, T.Murota. (Prov. Mountain) 1 ♀ 3 ♂, Bontoc, 29-30.XII.1979, T.Murota.

Negros. 3 ♀ 6 ♂, Taytay beach, 4-5.IV.1979, T.Tano(2♀3♂), H.Kurokawa(1♀), C.Nozaka(3♂). 3 ♀ 27 ♂, Mambucal, 2-3.IV.1979, C.Nozaka(2♀9♂), H.Kurokawa(1♀14♂), T.Tano(4♂).

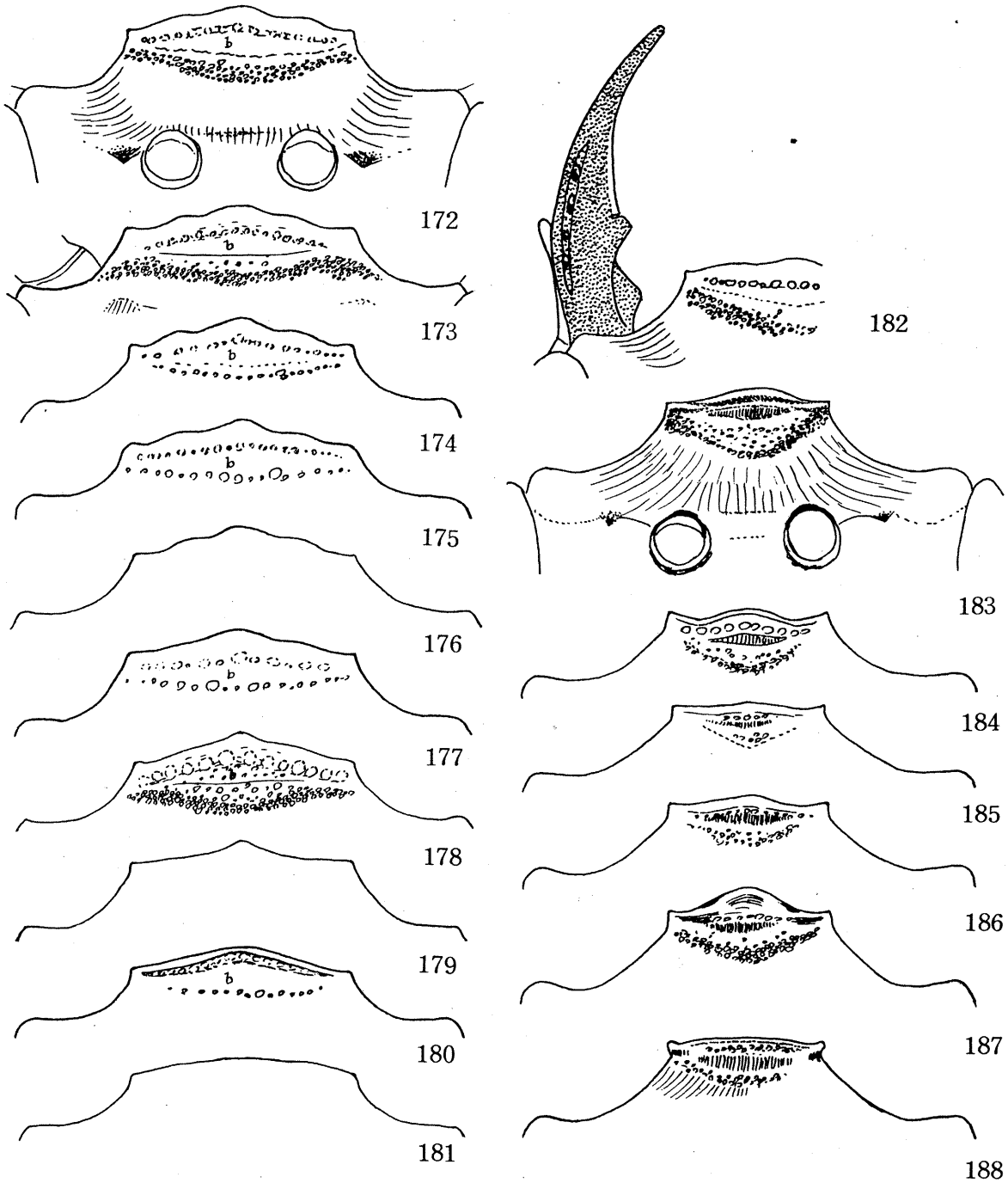
Cebu. 1 ♀ 1 ♂, Argao, 31.III.1979, H.Kurokawa(1♀), C.Nozaka(1♂).

Mindanao. 1 ♀ 3 ♂, Davao, 3-10.VIII.1980, T.Murota(3♂), T.Tano(1♀). 2 ♂, Zamboanga, 30.VII -2.VIII.1980, T.Murota(1♂), K.Sabi(1♂). 1 ♂, Bucidnon, 12.VIII.1980, T.Tano.

Differences from nigricolor. The present species is very closely allied to T. nigrocolor Dalla Torre and in ♀ the separation from this species is very difficult, but in ♂ it is comparatively easily distinguished from it.

♀. (1) The mandible is in nigricolor always medianly broadly reddish or ferruginous, while in tinctipennis it is usually wholly black, except narrow inner margin (Fig. 182), but sometimes medianly reddish or ferruginous; in such a case, however, the reddish or ferruginous area is not so bright as in nigricolor, namely considerably darkened. (2) Puncture-interspaces of mesopleuron are in tinctipennis always smooth and polished, while in nigricolor in the Japanese specimens always distinctly microcoriaceous, but in the Ryukyu and Formosan specimens only feebly so or sometimes without microsculpture. (3) Sculpture of propodeal dorsum (rugoso-reticulate and main course of rugae is longitudinal) is generally finer in tinctipennis than in nigricolor. (4) The spines of tibiae and tarsi are in tinctipennis usually white in colour and the tarsal rake of fore leg is also broadly white, only apically narrowly brownish; while in nigricolor the spines are always more or less brownish and the tarsal rake is more broadly brownish except narrow base of each bristle.

The results of measurements are apparently similar in both species, if the indivi-



Figs. 172-188. Tachysphex tinctipennis Cameron (172-181 - ♀, 183-188 - ♂).

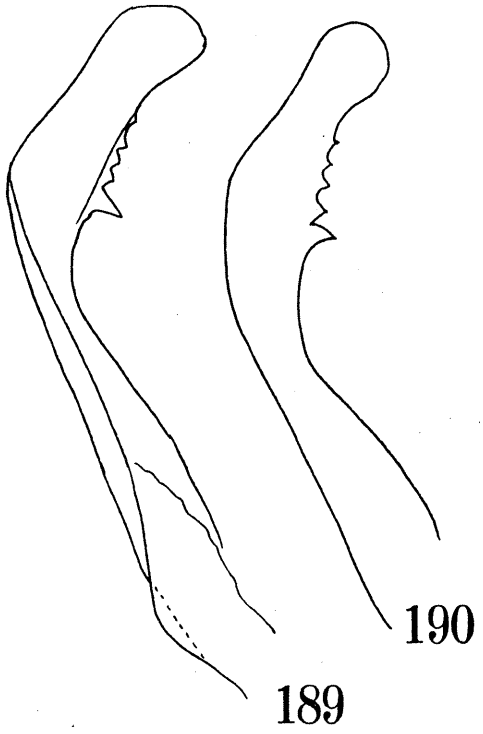
dual variations are taken into consideration. Actual measurements show, however, that IODv is relatively slightly narrower (as against HW) and the clypeal median lobe is also relatively slightly narrower (as against IODv, therefore, relatively slightly broader as against lateral lobe) than in nigricolor (see below). But the difference is slight and the variation ranges of both are partly overlapped and it can not always be applicable to separate the two species.

The form of clypeus is considerably variable in both sexes of both the species and generally very similar to each other species - cf. Figs. 172-181 in tinctipennis and the figures given on p. 50 of my 1967 paper on the Formosan Larrinae for nigricolor under the name of bengalensis. In tinctipennis anterior bevel is distinct and apical marginal area moderately broad and flat, usually weakly punctured, bevel is sometimes smooth, but sometimes sparsely punctured, its lower margin located at base of marginal area always with a transverse series of punctures, large or small, but always the punctures are very

shallow and weak. (Localities of the figured specimens: Luzon: Figs. 173, 174, 176, 177, 178, 179, 181, 185, 186, 188; Negros: Figs. 172, 173, 175, 176, 179, 181, 183, 184; Mindanao: Figs. 176, 180, 187.)

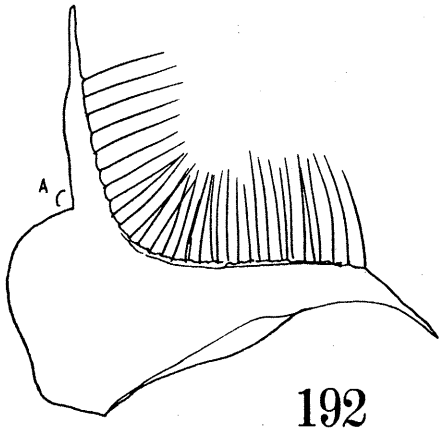
Relative length of abscissae of radial vein of fore wing is here also considerably variable and it can not be used as specific character in both species.

♂. (1) Fore tarsus: in nigricolor without rake bristles, T1 with a short spine near middle of outer margin and the outer apical spine of T2–4 is always single and short, while in tinctipennis tarsal rake is distinct, on outer side of T1 at least two fairly long and spaced bristles are present and outer apical bristles of T1 and T2 are usually 2 or 3 in number and always long, when single it is markedly thick as if to be the one formed of two bristles united. (2) Ventral margin of apical part of penis valve is in nigricolor provided with large and strong teeth, 3–5 in number, basal one always markedly large and spically gradually smaller, while in tinctipennis no special, large, basal tooth present, but only minutely serrate, the teeth are 5–6 in number and apically much smaller (Figs. 189 and 190). (3) Colour of mandible as in ♀.

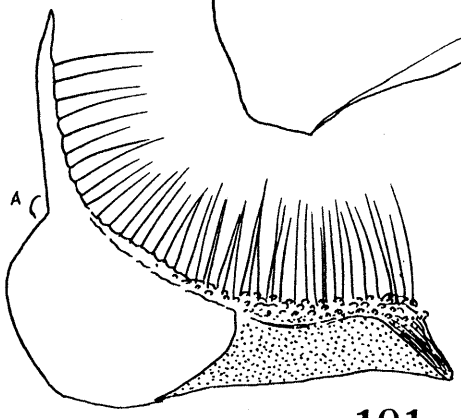


189

190



192



191

But punctation of mesopleuron is unapplicable in this sex and the difference in the colour of spines of legs is much less marked than in ♀. The form of apical margin of clypeus is considerably varied among the specimens without local character as given with Figs. 183–188. Flat dorsal expansion of volsella is fairly variable in the angle formed with apical slender process (A in Figs. 191 and 192) in tinctipennis, in nigricolor mostly as in Fig. 192.

Measurements (average of 5 specimens, within parenthesis nigricolor):

♀. HW,HL,IODv,A3=100,46,25,14 (=100,47,22,13). IODv,A2+3,IODc,CML=10,9,24,12 (=10,9,26,14). CML:CLL=10:6 (=10:5). A2,3,4,5,11,12=6,10,11,12,7,8 (=6,10,12,12,7,8). AOD,WAS,IAD=21,10,13 (=21,10,14). A3=AW×2.2 (=AW×2.5).

♂. HW,HL,IODv,A3=100,50,28,10 (=100,48,28,11)(IODv in tinctipennis constantly 28, but in nigricolor average of 29,30,26,26,30). IODv,A2+3,IODc,CML=10,6,22,7.5 (=10,7,22.5,9.7). CML:CLL=10:11 (=10:8). A2,3,4,512,13=9,10,12,13,10,13 (=9,10,11,12,9,11). AOD,WAS,IAD=12,5,7 (=12,5,8). A3=AW×1.4 (=AW×1.7).

Generally the amplitude in variation is larger in nigricolor than in tinctipennis. This may be due to the range of distribution of the two species.

When IODv=10, A2+3 in tinctipennis ♂ 6.5,6.0,6.0,6.0,6.0; in nigricolor ♂ 7.0,6.5, 6.5,7.0,7.5. Similarly IODc is in tinctipennis ♂ 22,22,21.5,22,21,5; in nigricolor ♂ 22.5,23,23,23,21.

40. TACHYSPHEX NIGRICOLOR (DALLA TORRE, 1897)

Larrada nigricans Smith (nec Walker, 1871), Trans. Ent. Soc. London, 1873: 192, 1873 (♀, Nagasaki, Japan; mesothorax impunctate' ♂ ... anterior tibiae and all the tarsi rufo-piceous').
Larrada nigricans: Kohl, Verh. zool. bot. Ges. Wien, 34:246, 260, 1884.
Larra nigricolor Dalla Torre, Cat. Hym., 4: 670, 1897 (nom. nov.).
Tachysphex japonicus Iwata, Tran. Kansai Ent. Soc., 4: 27, 1933 (♀ ♂, Japan).
Tachysphex japonicus; Shibuya, Ibid., 4: 51, 1933 (biol.).
Tachysphex bengalensis: Yasumatsu, Trans. Sapporo Nat. Hist. Soc., 16(2): 97, 1940 (Botel Tobago).
Tachysphex japonicus: Yasumatsu, Icon. Ins. Jap., Ed. II: 1476, 1950.
Tachysphex japonicus: Tsuneki, Life Study (Fukui), 6(1): 4, 1962 (Ryukyus); - Ibid., 8 (4): 63, 1964 (Korea); - Etizenia, 17: 14, 1966 (Ryukyus).
Tachysphex bengalensis japonicus: Tsuneki, Etizenia, 20: 49-53, 1967 (redescr. variat., 33 figs.).
Tachysphex bengalensis japonicus: Tsuneki, Ibid., 55: 12, 1971 (geogr. variat., 23 figs.)
Tachysphex japonicus: Pulawski, Zak. Zool. Syst. Dos. Polsk. Akad. Nauk, p. 162, 1971 (redescr. 5 figs.).
Tachysphex bengalensis japonicus: Tsuneki, Etizenia, 65: 7, 1973 (Ryukyus).
Tachysphex nigricolor: Pulawski, J. Wash. Acad. Sci., 64(4): 310, 1975 (japonicus is a syn.).
Tachysphex nigricolor: Bohart & Menke, World Sphecid., p. 275, 1976 (listed).
Tachysphex nigricolor (ssp. yaeyamanus): Tsuneki, SPJHA, 23: 28, 1982 (S. Ryukyus).
Tachysphex nigricolor: Tsuneki, Ibid., 23: 60, 1982 (C. Ryukyus).

Specimens examined: 3 ♀ 2 ♂, Negros: 2 ♀, Mambucal, 2-3.IV.1979, C.Nozaka; 1 ♀ 2 ♂, Taytay beach, 4-5.IV.1979, T.Tano(1♀), C.Nozaka(2♂). 1 ♀, Mindanao, Zamboanga, near beach, 1.VIII.1980, T.Murota.

Remarks. A considerable taxonomic comment was given in connection with the preceding species on the characters of the present species. As to further explanations see Tsuneki, 1967 and 1971, and also Pulawski, 1971.

KEY TO THE SPECIES OF TACHYSPHEX OCCURRING IN THE PHILIPPINES - JAPAN

♀ ♀

1 Hair of propodeal dorsum somewhat stiff, inclined forwards or obliquely forwards, T4 longer than wide, acutely emarginate at apex (claws not prehensile, T5 without spine on venter and lateral margins, its ventro-apical margin straight, HW:IODv=4:1-5:1, IODv≒A2+3, medial lobe of clypeus wider than lateral lobe, ratio 2:1-3:2, vertex usually without microreticulation, if with very feelle and surface shining, A3=AW×2.2-2.5, hair on mesoscutum appressed, 1-1.5 times FOd - the species all belong to pompiliformis-group and run either (Pulawski, 1971) to japonicus Iwata, namely nigricolor Dalla Torre or (Pulawski, 1977) to puncticep Cameron) 2

\- Hair of propodeal dorsum soft, either erected perpendicularly or inclined obliquely backwards, T4 shorter than, or as long as, wide, claws prehensile) .. 7

2 T2-5 or T3-5 wholly or largely ferruginous, apical 3 of rake bristles of fore T1 separated from each other and divergent outwards (apical margin of clypeus gently and uniformly trilobate, PIS on frons microcoriaceous, mandible broadly ferruginous in middle), 6.7-9.3 mm, Formosa formosanus Tsuneki, 1971

\- T1-5 black or brownish black, apical 3-4 of rake bristles of fore T1 almost contiguous to each other, frequently forming a bundle (very rarely subcontiguous on nigricolor) 3

3 Length 5.5-6.5 mm, tarsal rake of fore leg almost completely silky white, sometimes with apex somewhat pale brownish (well opened mandible seen in front with median area broadly ferruginous - except apical third, basal fifth and basal half of outer margin -) puncticeps Cameron, 1903 4

\- Length over 7.5 mm, fore tarsal rake usually broadly, or at least more broadly brownish 5

4 Puncture interspaces of frons smooth and shining Formosan population

\- PIS of frons microreticulate or microcoriaceous Philippine population

5 Well opened mandible seen in front almost completely black, except inner margin at median area and sometimes obscurely a narrow median area, tarsal rake and spines of tibiae and tarsi somewhat broadly whitish
tinctipennis Cameron, 1904

- Mandible seen in front with a more distinct ferruginous area in middle, tarsal rake and spines of tibiae and tarsi more broadly brownish
nigricolor Dalla Torre, 1897 6

6 Puncture-interspaces on mesopleuron as a rule microcoriaceous
Japanese population

- PIS on mesopleuron as a rule without microreticulation or microstriae
Philippine and Formosan population

7 Hair on frons, mesoscutum and on baso-lateral area of mandible consist of two types, long sparse one and short dense one, IODv:IODc≒1:2, clypeal medial lobe (CML) wider than lateral lobe (CLL), mandible very slender and long, about 6 times as long as wide at inner tooth, T4 not or very weakly emarginate at apex, lateral carinae of propodeal dorsum strong and complete, sides strongly closely punctured and obliquely weakly striate (hair on lower frons and clypeus silvery), 9-12 mm
novarae (Saussure, 1868)

- Hair on mesoscutum uniform, short and appressed, IODv:IODc=1:3-1:4, CML distinctly narrower than CLL, mandible relatively shorter, at moat less than 4 times as long as wide at inner tooth, T4 deeply and acutely incised at apex, lateral carinae of propodeal dorsum lacking, or very weak and incomplete, sides mainly longitudinally strongly striate, mixed with weak punctures 8

8 Hair on lower frons and clypeus silvery, HW:IODv≒4:1, IODv slightly greater in length than A2+3, clypeus bevelled medio-anteriorly, apical margin medianly widely rounded out, 9 mm
lagunaensis sp. nov.

- Hair on lower frons and clypeus golden - brassy, HW:IODv≒6:1, IODv=A2+3, clypeus without distinct bevel, rather stepped, apical margin medianly roundly incised
changi Tsuneki, 1967 9

9 Mandible about 4 times as long as wide at inner tooth, apical margin of median lobe of clypeus subtruncate and more or less distinctly incised in middle, hair on clypeus pale brassy to silvery
nominate form
(=nambui Tsuneki, 1973)

- Mandible shorter, 3-3.5 times as long as broad at inner tooth, medio-apical margin of clypeus without medial incision (presumed from the male)
ssp. luzonicus ssp. nov.

♂ ♂

1 Hair of propodeal dorsum somewhat stiff and inclined forwards or obliquely forwards, T4 longer than wide, and acutely incised at apical margin 2

- Hair of propodeal dorsum soft, perpendicularly erected or inclined latero-posteriorly, T4 shorter than wide or as long as wide, not so acutely incised at apex, claws prehensile 5

2 Fore tarsus with rake bristles, T1 at least with 2 bristles on outer margin, and 2 or 3 apical bristles in addition (bristles distinctly longer tha apical width of fore T1) 3

- Fore tarsus without rake bristles, but with spines that are not longer than apical width of fore T1 4

3 T2-5 or T3-5 ferruginous, basal incision of fore femur shortly carinate at base in middle (mandible broadly ferruginous)
formosanus Tsuneki, 1971

- Tarsi black, except apical incised area of each joint, basal incision of fore femur not carinate at base in middle, but carinate on basal margin of the incision, mandible at least largely black
tinctipennis Cameron, 1904

4 Lenghh 6.5-8.5 mm, median lobe of clypeus (CML) distinctly wider than lateral lobe (CLL), striae on sides of propodeum coarse and oblique (ventral margin of apical part of penis valve with more than 3 teeth)
nigricolor Dalla Torre, 1897

- Length 4.5-5.5 mm, CML as wide as, or narrower than CLL, striae on sides of propodeum fine, close, nearly longitudinal (penis valve with one large tooth only, sometimes with small second tooth)
puncticeps Cameron, 1903

5 Fore tarsus with rake bristles, hair on vertex soft and long, about 4 times as long as FOd, that on frons and mesoscutum consists of two types, short, appressed and dense one and long, erected and sparse one, IODv:IODc≒1:2, at least =1:1.7, mandible very slender and long, 5.5-6 times as long as wide at inner tooth, lateral carinae of propodeal dorsum stong and complete (CML wider than

CLL, hair on lower frons and clypeus silvery), length 5.0–8.5 mm
novarae (Saussure, 1868)

– Fore tarsus without rake bristles, hair on vertex short, erected, sometimes mixed with a few long one, that on mesoscutum uniform, short, dense and appressed, IODv:IODc≒1:3, at least 1:2.5, mandible not so slender and long, lateral carinae of propodeal dorsum lacking or weak and indistinct (CML markedly narrower than CLL) 6

6 Hair on clypeus silvery, mandible black, only on inner margin and at apex dark red, HW:IODv≒4:1, IODv > A2+3, length 5.5–6.5 mm
lagunaensis sp. nov.

– Hair on clypeus golden or brassy, Mandible medianly distinctly ferruginous, HW:IODv≒6:1, IODv=A2+3 changi Tsuneki, 1967 .. 7

7 Mandible about 4 times as long as broad at inner tooth, clypeus at apical margin of medial lobe only gently roundly produced, length about 9 mm, Formosa and southern Ryukyus nominate form

– Mandible robuster, about 3–3.5 times as long as width at its inner tooth, medio-apical margin of clypeus more distinctly roundly produced in middle, length smaller, 6.5–7 mm, known from the Philippines and ? Ceylon
ssp. luzonicus ssp. nov.

II. TRIBE MISCOPHINI

ON THE SYNTYPES AND THE RELATED SPECIMENS OF LYRODA VENUSTA BINGHAM

As was pointed out by me in my 1967 paper (p. 56) it is quite doubtful that Lyroda venusta: Williams (1928) correctly shows Lyroda venusta Bingham (1897), and, moreover, it seems that Lyroda venusta: Williams may include more than one species within. As the original description of Lyroda venusta is quite insufficient it has been desired to re-examine and redescribe the type specimens of this species.

Through the courtesy of Mr. C. R. Vardy of British Museum (Natural History) the chance was given to me. In the following the results of my reexamination will be presented:

1. The present state of the specimens

The specimens that were sent on loan from the British Museum (Natural History) as the probable syntypes of Lyroda venusta Bingham consist of five specimens (A–E), two of which (A and B) are attached with a red-circled round Type label (7 mm in diameter) respectively and each of the five is attached with a data label as given here which is stampted with purple ink and written in by the hand of Bingham the locality and date of the specimen between the upper and lower lines.

T E N A S S E R I M
B I N G H A M Coll.

The pinned specimens are possibly reprepared. Each is stuck either on a polyethylene gam (A–C) or on a card paper (D and E) that is supported with a 25 mm insect pin. All have the wings spread laterally.

Specimen A. With 5 labels, from the top: (1) Circular Type label, (2) data label, handwritten in: Karen Hills, Papuro, 4. 91. (3) Name label: Lyroda venusta Bingh. Type ♀, written in by the hand of Bingham in 4 lines with black ink, (4) Coll. C. T. Bingham 96 - 30, pressed in 2 lines, (5) Museum label, B. M. TYPE HYM. (pressed) 21. 415 b (handwritten).

The head was glued to the neck incorrectly and the greater part of the clypeus and a part of lower frons were covered with paste; left one of the antennae, left fore leg and right hind tarsus were missed. The paste on the head was removed by being washed with alcohol and the head was correctly glued to the neck.

This specimen is possibly the so-called female of Lyroda venusta Bingham, type, but in reality it is a male, judging by the antennal and gastral segments and, moreover, it is a species different from the remaining specimens.

Specimen B. With 5 label, from the top: (1) Type label, (2) data label, written in by the hand of Bingham: Atalan Valley, 4 - 91, (3) Name label: Lyroda venusta Bingh Type ♂, written by Bingham in 4 lines with black ink, (4) Col. C.T.Bingham 96-30 pressed in 2 lines, (5) Museum label as in specimen A, but with: 21. 415a, handwritten.

From the specimen the right antenna from joint 9 apically, right mid femur-tarsus and left hind wing are lacking.

This is certainly a male, but it belongs to a species different from A.

Specimen C. With 3 label, from the top: (1) Data label with: Taungyin Valley, 8-94, handwritten in, (2) Name label: Lyroda venusta Bingh ♀, written by the hand of Bingham in 3 lines, (3) Col. C.T.Bingham 96 - 30 pressed in 2 lines.

From the specimen the head is missing. In reality it is a male and seems to be the same species as A, judging from the sculptural character of the propodeum and the basal structure of the gaster. The gaster of the specimen is dissected to observe the genital organs.

Specimen D. With 3 labels: (1) Data label, with: Shwegyin 6. 98, written in by Bingham in 2 lines, (2) ♂, (3) Col. C.G.Nurse Collection 1920-72, pressed in 3 lines.

This is a complete male specimen belonging to the same species as B.

Specimen E. With 3 labels; except ♀ in label (2), same as in specimen D.

Certainly a female of the same species as B and D. From the specimen the left antenna from joint 4 apically is lacking.

2. Designation of the lectotype

Judging from the data label attached D and E are not the syntype specimens of Lyroda venusta used by Bingham at the moment of his description, because they are collected after the publication of the species. of the rest C is incomplete and so we must designate either A or B as the lectotype of the species. There is, however, an important problem here. That is that A and B are different species. The present condition of the specimens is better in B and the sexing by Bingham is correct in this specimen. Moreover, D and E belong to the same species as B, that is to say, in this species both sexes are known. Taking into account the above mentioned facts we are tempted to designate speci-B as the lectotype of Lyroda venusta Bingham.

Unfortunately, however, this specimen is aberrant in its wing venation, that is to say, it lacks completely the first transverse cubital vein in both fore wings, bearing only two cubital cells (Fig. 214).

Hereupon we are compelled to designate specimen A as the lectotype of Lyroda venusta Bingham, although it is not in a preferable condition of the preparation.

3. Redescription of the lectotype of Lyroda venusta Bingham, 1897

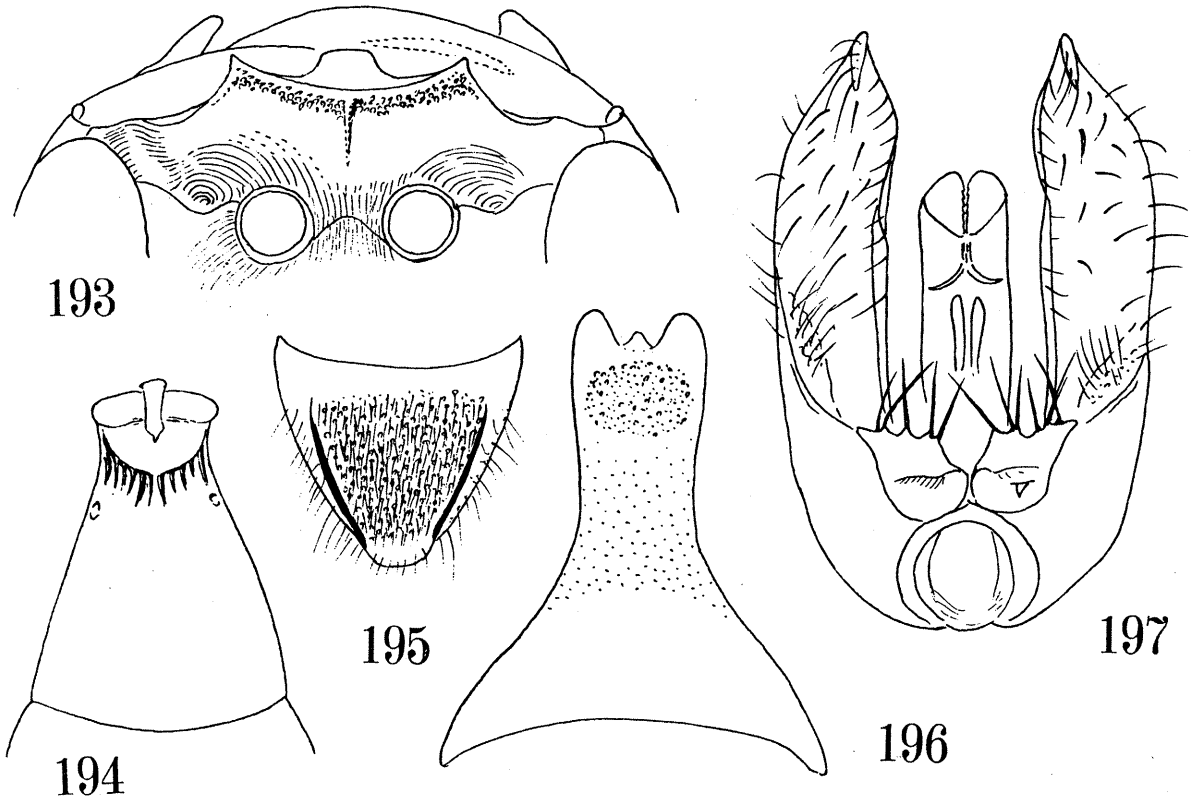
Lyroda venusta Bingham, Faun. Brit. Ind., Hym. I, p. 210, 1897 (♀ ♂, really ♂ ♂, Tenasserim).

♂ (specimen A above mentioned). Possibly about 8 mm in the normal condition. Black; mandible bright ferruginous and apically castaneous, tegula brown, with inner area broadly darkened, wings hyaline, apically slightly clouded, veins ferruginous, but costa, subcosta and stigma slightly darker, legs dark brown, apically pale brownish, in fore leg somewhat more brightly so, tibial spurs, fore T5 and all claws ferruginous, spines of tibiae and tarsi white; hair silvery, its distribution normal to the genus as was given in the original description, but on gaster the pile bands on GT1-3 only, not on GT4 (as described in the original descript on), but GT5 apically and GT6 completely covered with short silvery hair, hair on pygidial area of GT7 in some light appears brassy, because apical part of the segment broadly ferruginous.

Seen from above HW,HL,IODv,A3=100,58,51,18. OOD,Od,POD,OCD=7,3,9,31. IODv:IODc=20:21. AOD,WAS,IAD=6,5,6. CML:CLL=10:6. A2,3,4,5,12,13=7,10,8,8,6,9. A3=AW×2.8. Head from above impression at the outer side of hind ocellus very shallow, ocellar area gently raised and broadly, longitudinally depressed between hind ocelli, post-ocellar elevation very weak, frons with distinct median furrow, stronger than in specimen B. Clypeus: Fig. 193, apical margin broadly roundly emarginate, with a large medial prominence which is obliquely flatly bevelled and smooth and polished, lateral marginal area obliquely inclined forwards and posteriorly towards the tentorial pit, disc medianly above apical prominence shortly subcarinate, mesoscutum medio-anteriorly with a fairly deep furrow, reaching posteriorly about middle of the scutum, scutellum medianly gently raised and more shining than scutum. On mesopleuron sternal sulcus deep and foveolate (covered with silvery hair), ending at the lower margin of the pleuron, scrobal furrow defined only at anterior part, scrobe well defined, rounded and deep. Dorsum of propodeum without lateral carinae (no trace even in all light condition), medial carina pre-

sent, not strong, not reaching apex where shortly transversely carinated just above medial depression of posterior inclination. In lateral view dorsum slightly longer than posterior inclination till top level of gastral socket rim (about 5:4), socket rim produced and reflected as usual, angle between both aspect about 130°, with top rounded, dorso-medial depression of posterior inclination broad, comparatively shallow, rounded subtriangular in outline, not well visible due to sense silvery hair, but median longitudinal bottom line deeply impressed and distinct. Abscissae of radial vein of fore wing with relative length (when A5=3) 5,2,3,1,4=3,3,7,7.5,8(right) and =3,2.5,6,8,8 (left) (in the headless specimen, C =3,4,7,7.5,8 in both); those of cubital cell 2 under same scale as above, 1,2,3=2,5,5(left), =2,5.5,6(right). Relative length of T1-5 (from basal constriction to apex, when apex is incised to mid point of the line connecting lateral apices of the segment, in T5 arolium is excluded): In fore leg 20(standard length),10,7,6,10; in mid 27,14,10,7,10 and in hind =30,16,13,9,10. Fore T1 with whitish rake spines on outer margin just as in Fig. 207, T4 at apex obtusely incised and T5 broadly, deeply and acutely incised in all legs.

GT1 in dorsal view: Fig. 194, relative length of median line (from extreme base till apex) and basal (at constriction) and apical width = 50,16,41; basal platform highly raised, completely margined with acute edge, only somewhat obtuse at apical middle where very narrowly cut open by a groove, longitudinal carinae behind the platform numerous (6 on each side), not long (Fig. 194), surface of the platform nearly flat and mainly transversely rugoso-subreticulate under high magnification and mat; pygidial area: Fig. 195.



Figs. 193-197. Lyroda venusta Bingham, newly designated, ♂

Vertex and frons very finely and very closely micropunctulate, almost microgranulate or microcoriaceous (not clearly seen due to trace of paste), mesoscutum (also covered largely with liquid paste) closely micropunctulate, with PIS very finely striate under high magnification, surface not shining, scutellum slightly more sparsely and slightly largely punctured, PIS distinctly microcoriaceous, mesopleuron finely, weakly and sparsely punctured (not well visible due to spread wing and dense silvery hair). Dorsum of propodeum somewhat coarsely rugoso-subreticulate, from median carina emitted distictly a series of transverse rugae, on postero-lateral areas of dorsum and upper lateral parts of posterior inclination several transverse (partly V-shaped) carinae highly raised and marked, posterior inclination transversely coarsely rugose, with intervals finely, irregularly rugulose, sides above stigmatal furrow obliquely, below the

furrow transversely, both finely and closely rugoso-striate, striae on lower part more strongly rugosed. Gaster very finely, fairly closely, rather weakly (especially on GT 1 micropunctulate, except apical portion.

Lectotype: ♂ (nec ♀, though so labelled), specimen A above listed (Tenasserim, Karen Hill, Papuro, April, 1971, C.T.Bingham coll. (Brit. Mus. N. H.).

Other specimen: Specimen C (♂ nec ♀) above listed. Judging by the characters of thorax and abdomen, especially of the surface sculpture of propodeum this specimen belongs no doubt to L. venusta newly designated.

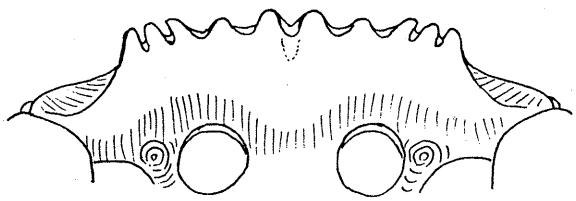
The gaster of this specimen was dissected and the 8th sternite and genitalia were examined: Figs. 196 and 197. Genitalia are characteristic in having the paramere scattered sparsely with strong curved bristles on its ventral surface and along lateral margins and the 8th sternite in the trilobate apex.

4. Taxonomic alteration and confirmation resulted from the designation

A. Lyroda taiwana Tsuneki, 1967 is a subspecies of L. venusta Bingham.

Lyroda taiwana Tsuneki, Etizenia, 20: 56, 1967 (♀ ♂, Formosa).

The male of taiwans well agrees in characters with the lectotype of venusta newly designated, especially in the structure of the clypeus and genital organs. In the figures of taiwana given by me the male pygidial area is triangularly incised at apex and apparently different from that of venusta. It was confirmed, however, by the reexamination that this was a mistake of the produced apical part of GS8 for epipygium due to the dense hair covering the area. Detailed comparison reveals, however, that taiwana slightly differs from venusta in some characters which seems worthy of separation of them at the subspecific level: In taiwana (1) colour of legs generally slightly darker, fore leg and all T5 not so pale, (2) tarsal joints relatively somewhat shorter, except hind T1, (3) hair on frons, pro- and mesonotums and rest of propodeum distinctly brassy, (4) Propodeal dorsum always without strong carinae on postero-lateral areas and (5) basal rounded platform of GT1 always distinctly concave and somewhat coarsely rugoso-striate.



198

Fig. 198. Lyroda venusta taiwans Tsunei, ♀.

By this specific synonymy the characters of the female of L. venusta s. str. has become considerably presumable. The detailed description of this sex was already given in the above-cited literature. Here the form of clypeus alone is given for reference. The form and combination of the apical teeth - lateral three, medial pair and intermediate one - are very constant in the 4 specimens reexamined of Lyroda venusta taiwana Tsuneki.

B. Lyroda venusta: Williams, 1928 is an undescribed different species.

Judging from the Williams' comment that there is some variation on the clypeus and from the fact that a closely allied different species is newly discovered from Luzon (as will be described later as L. laguna) it seems highly probable that there may be more than one species within his venusta (18 ♀ 15 ♂ from Luzon, Sibuyan and Samar). But here the specimens that are illustrated by him as ♀ and ♂ of his venusta alone are dealt with and named as follows:

Lyroda williamsi sp. nov.

Holotype: ♀ the specimen bearing clypeus of his Fig. 49.

Paratype: ♂ ditto, with genitalia of his Fig. 161.

Remarks. There is some question as to the sex combination, but here it is disregarded.

C. Lyroda japonica Iwata is a distinct species.

It has long been doubted whether L. japonica is a species really different from L. venust or not, because no morphological character is compared between the two species, only the larger body size, golden pile of head and thorax (in reality not always golden, but very frequently silvery) and lack of pile band on GT4 in L. japonica are emphasized. Now, it has become clear that japonica differs from venusta in the form of apical margin

of clypeus (♀ ♂, cf. Tsuneki, 1967, p. 57 and 59) and it is easily separable from venusta, but in the lack of pile band on GT4 both are quite identical - an error in the Bingham's description. In the structure of the genitalia and sternite 8 both species are very similar (cf. Tsuneki, 1967), but in japonica the genitalial paramere is relatively somewhat broader than in venusta.

D. Lyroda argenteofacialis (Cameron, 1889) is a doubtful species.

This species (= Astata argenteofacialis Cameron, 1889, from Barrackpore, Bengal) was originally described as ♀, but according to the reexamination of the syntypes by Pulawski (1975) they are in reality ♂ ♂ - the fact is presumed from the original description of apical margin of the clypeus: "incurved in the middle at apex". It is further supplemented by Pulawski to have "a mesal arcuate lobe". It is just the same as in L. venusta (sens. nov.). Further, it is also consistent to each other that relative length of abscissae 2 and 3 of radial vein is 1:2, though this character is not so important. But argenteofacialis has the black gaster and distinctly brownish Gl (confirmed by Pulawski; in the original description "the basal and apical segments are more or less blackish" as if others are brownish or reddish).

Cameron further remarks that "what is apparently the same species has the first and second abdominal segments clear red, and the others quite black". The reason that Bingham (1897) listed this species as a questionable synonym of L. formosa (Smith, 1858) seems to lie upon this remarks. But Pulawski dealing with the syntypes (2 ♂♂) of this species could not confirm this synonymy. To me it seems, however, that at the moment of description of argenteofacialis Cameron has a complex of two species before him and one of which is possibly formosa.

It seems possible to me that argenteofacialis may be a local form of either formosa or venusta and to determine this one should compare the curvature of the apical margin of the clypeus, since it is gentle in formosa ♂ (Figs. 219, 220) and strong in venusta ♂ (Fig. 193). But it is also possible that the discovery of its female may explode this presumation.

E. Lyroda nigra (Cameron, 1904) is considered a different species.

Originally described as Odontolarra nigra from Sikkim and according to the original description (without figure) the apical margin of the clypeus in this species (♀) has a set of three teeth laterally and a pair of tubercle in middle, one on each side of medial furrow. As to the state of the intermediate area between the two sets no mention is made by the author. If there is no tooth nor undulation the form of the apical margin of the clypeus in this species is very similar to that of L. japonica and presumed to be different from both of formosa and venusta.

F. Lyroda salai Giner Mari, 1945 is a distinct species.

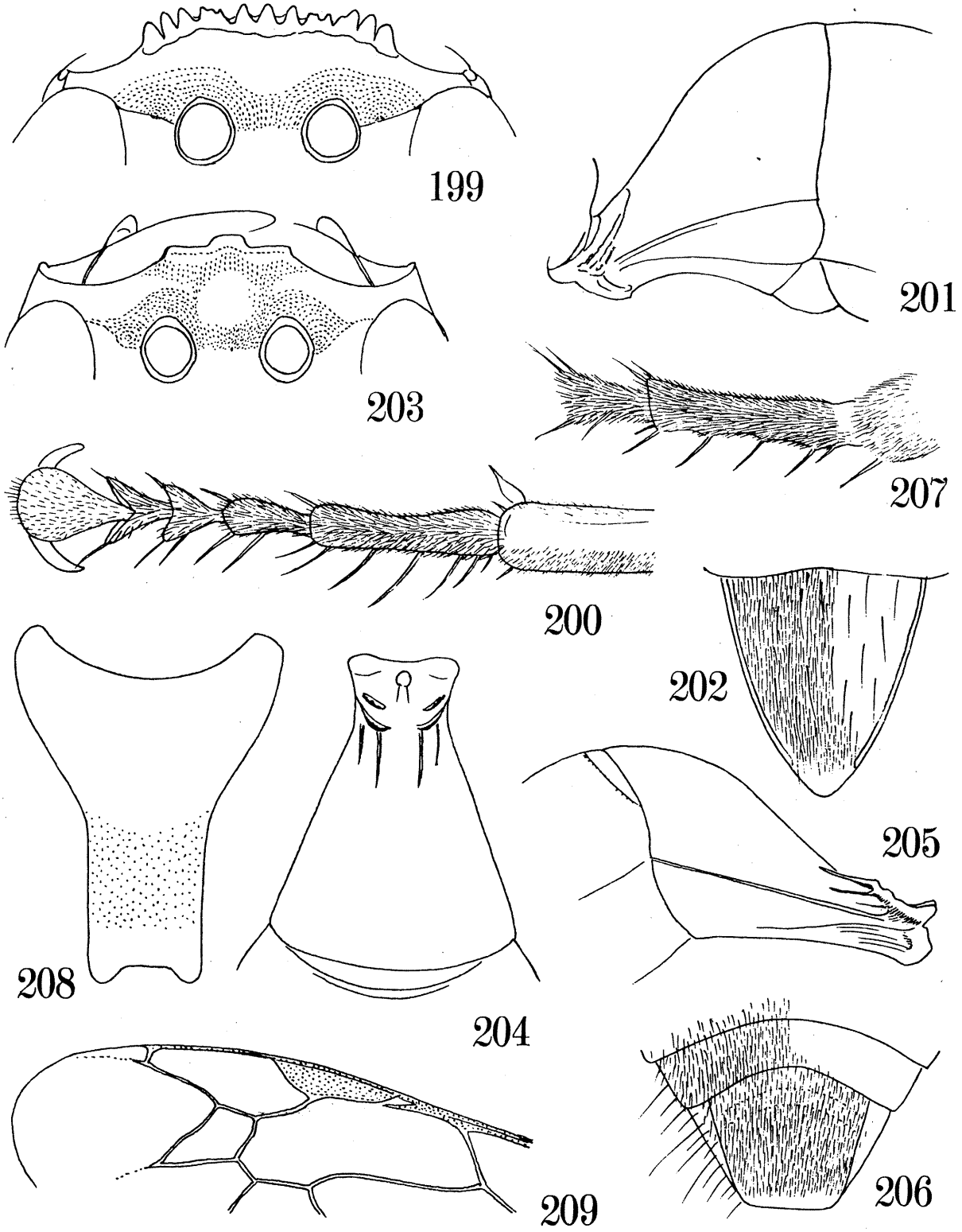
According to the original description and the annexed figures Lyroda salai is distinctly different from L. venusta taiwana in the form of apical margin of clypeus in ♀. In salai, besides the lateral set of three teeth and medial pair, there are two short teeth between the two sets, while in venusta taiwana there is only a single tooth between the two sets (Fig. 198). This character is very constant in this genus (cf. Figs. 215-218 in formosa). Moreover, in salai fore wing has a blackish fascia crossing the 2 cubital cells and apex of 2nd discoidal cell, though not strong.

G. Lyroda binghami sp. nov.

This is a species mixed with Lyroda venusta lectotype and different from it, including specimen B, D and E above mentioned. As it is different from other known species it is described below as new:

♀. 8.5 mm. Black; mandible except base light castaneous and apically darker palpi also light brown, closely covered with short brownish pubescence, tegula brown, from anterior to inner part broadly dark, wings hyaline, apically slightly darkened, veins light brown or brown, stigma ferruginous; legs slightly brownish, articulations of tibiae and tarsi, tibial spurs and all T5 ferruginous, T3 and T4 of all legs somewhat more brownish than T1 and T2. Hair on lower frons and clypeus silvery, dense and appressed, pile on anterior frons on both sides of medial furrow very short, fine and velvety-black and the areas appear like dark marks in the bright surface, on other parts of the body as given in the original description of L. venusta by Bingham, but on gaster only GT1-3 (not 4) are adorned with silvery pile bands, GT4, GS4, GT5 and GS5 all posteriorly broadly and GS6 wholly, covered with dense golden velvety pile, pygidial area of GT6 also densely covered with short golden hair, mixed sparsely with half erect long bristles.

Seen from above HW,HL,IODv,A3=100,54,55,21. OOD,Od,POD,OCD=7.3.9.15. Seen in front

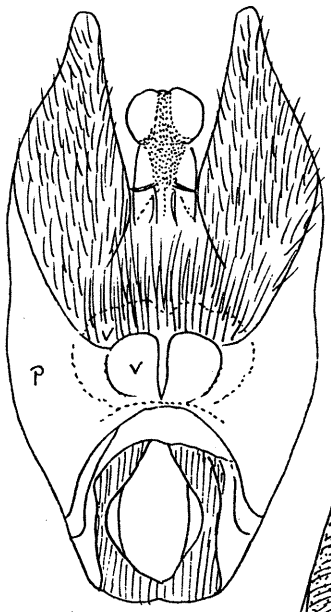


Figs. 199-209. Lyroda binghami sp. nov. 199-202 ♀, 203-209 ♂. 209 aberrant.

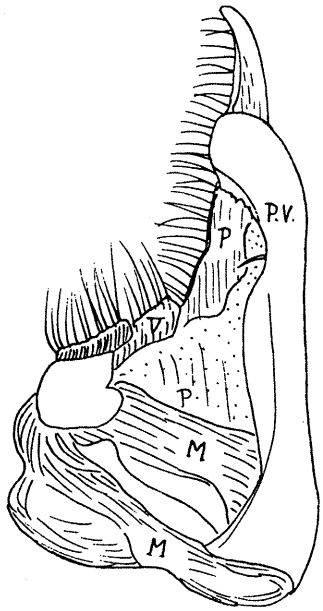
HW,HL,IODc=100,76,54 (maximum width of clypeus relatively 64). AOD,WAS,IAD=6,5,8. A2,3,4,5,11,12=4,10,8,8,5,8. A3=AW×3.3 (apically gradually widened and near apex abruptly incrassate). Clypeus: Fig. 199, lip at medial and lateral areas stoutly tridentate, with intervals variously (2 or 3 toothed). Wing venation normal, abscissae of radial vein of fore wing in the following length-increasing order: 2,5,3=1,4, relative length: 2,3,9,9.5,16. Pro and mesonotums normal in structure, scutellum medio-posteriorly with a

feeble tubercle, on mesopleuron episternal suture strongly foveolate, not reaching acetabular carina, scrobal furrow distinct, mostly smooth; propodeum without distinct lateral carinae, but in some light a weak rugosed carina comes to appear, but not at extreme lateral margin, but slightly more inside of it, median carina strong and distinct, reaching close to posterior margin where a short transverse carina present, median furrow of posterior inclination wedge-shaped, stigmatal furrow on side fairly deep at base, but posteriorly shallower. Relative length of T1-5 (from basal constriction to the apical line connecting the lateral ends of the segment) in fore tarsus: 20(standard length),10, 6,6,12; in mid tarsus: 27,14,9,7,12 and in hind one 31,16,11,8,12. T4 always broader at apex than in T3; apices of T1 and T2 not incised, T3 obtusely roundly emarginate and T4 deeply and acutely incised, in fore taruus (Fig. 200) T1 with rake spines on outer (posterior) margin, 7 in number, not equidistant, medianly longer, the longest one nearly twice as long as the medial width of T1 (at base and apex enlarged). G1 in dorso-vertical view with relative values of median length (from the contact point with top of gastral socket rim of propodeum) and width at base (at basal constriction) and at apex: 30, 11, 35; in lateral view: Fig. 201, height at posterior margin and length at ventral margin relatively 27:15, lateral margin of the segment acutely edged; pygidial area: Fig. 202.

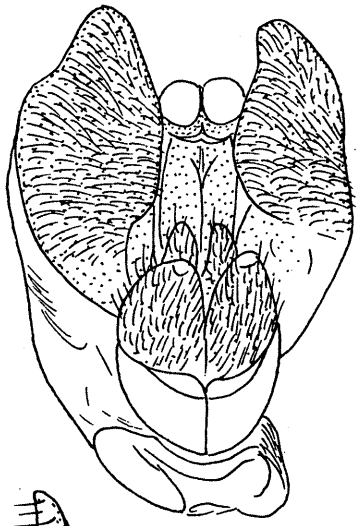
Vertex and frons very finely and densely micropunctulate, mesoscutum and scutellum similarly micropunctulate, apparently microgranulate, punctures on mesopleuron finer, shallower and somewhat sparse, especially on posterior area punctures very weak. Propodeum coarsely rugoso-reticulate (transverse rugae emitting from median carina more numerous than longitudinal, except ones at the inside of the lateral margin), sculpture fin-



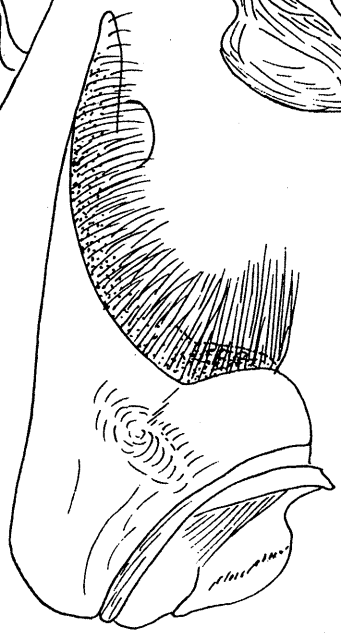
210



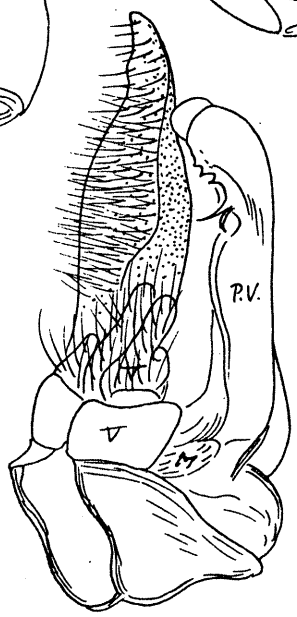
213



212



211



214

er and weaker laterally and posteriorly; sides above stigmatal furrow and posteriorly transversely, somewhat obliquely, finely and closely punctate-striate, on extreme dorsal area somewhat coarsely rugoso-reticulate and on posterior portion a few transverse and strong rugae mixed. Gaster much more finely and closely micropunctulate than on scutum, on pygidial area surface so densely covered with golden hair that ground sculpture can not be seen (in closely allied japonica ground punctures well visible).

♂. 7.5 mm. Black, densely covered with silvery pile as in ♀ and pile bands on gaster are also on GT1-3 only, not on GT4, GT5 at apex and GT6 and 7 wholly closely covered with short silvery hair which appears in some light glittering brassy, due to ferruginous ground colouration. Mandible bright ferruginous, from the ventral incision apically glossy brown, legs dark brown or brownish black, articulations somewhat paler, tibial spurs and fore T3-5, mid and hind T5 ferruginous (colour of legs may be faded already), tegula translucent brown, veins and stigma also brown, but costa and subcosta darker. GT6 and 7 ferruginous.

Seen from above HW,HL,IODv,A3=100,54,50,15. OOD,Od,POD=6,3,8. Impressions from outer to posterior side of hind ocelli broad and comparatively shallow (in some species the impressions markedly deep), impression in front of fore ocellus also shallow, thence a shallow furrow runs to abvoe antennal bases, with a fine shining bottom line in middle. Seen in front HW,HL,IODc=100,70,55. AOD,WAS,IAD≒5,5,6. Clypeus: Fig. 203, medio-apical prominence slightly bevelled, disc on basal 2/3 gently roundly elevated, CML:CLL=6:5. Al 2,3,4,5,11,12,13 (A3=10 as standard) =19,7,10,10,10,9,9,13.5. Al=MW×2.4, A3=AW×2, Al2≒W×1.6. Increasing order of abscissae of radial vein 2≒5,3≒1,4, relative length: 3,3.5, 10,11,21. In the aberrant form (Fig. 209) relative length of abscissae 5,3,1+2,4=3.5,9, 18,22. In both specimens accessory cell vaguely margined posteriorly. Pronotum and mesothorax normal in structure, scutellum and postscutellum without medial longitudinal elevation, propodeum in lateral view with dorsal margin straight, except basal short elevation, with posterior margin gently upcurved, angle between them slightly more than 120° and acutely angled at top, dorsum without lateral carinae, but in some light feeble incomplete vestigial longitudinal carinae observed, but not at lateral margin, but slightly inside, medial carina distinct, almost (but not completely) reaching posterior margin which is shortly transversely carinated; posterior inclination with a broad median depression, attenuating apically in wedge-shape and inclined towards median bottom line which is distinctly impressed and shining; sides with an oblique stigmatal furrow. GT1 in dorsal view (Fig. 204) with relative width at base and apex and medial length 10,17,30, in lateral view (Fig. 205) dorsal length and basal and apical width relatively 30,7,19. In dorsal view lateral margins acutely edged and carinated, basal area (which comes to contact with the gastral socket of propodeum when gaster is raised) roundly margined with carina, except narrow medio-apical part, from the ends of the carina short carinae run posteriorly, a similar carina present on each side of each (Fig. 204), GT7 turned into broad pygidial area, margined on both sides with acute edge, surface flat, narrowed apically, with apex broad and subtruncate (Fig. 206). Relative length of fore T1-5=20,10, 7.5,7,11 (T1=20 as standard); mid T1-5=28,13,10,6,12; hind T1-5=35,18,15,9,13 (there is always 1-1.5-valued stalk before constriction). Fore T1 (Fig. 207) at base thick, medianly narrowed and again enlarged apically, provided with 6 spines on outer side, basal one short and close to 2, 2-5 equidistant, in all legs T3 obtusely and T4 deeply and acutely incised at apex.

Sternite 8: Fig. 208, at apex bilobed, without medial prominence. Genitalia in ventral view: Fig. 210 (V volsella, P paramere), outer lateral view: Fig. 211, in order to observe better the volsella seen obliquely from apical and ventral side (somewhat from left side): Fig. 212 (actually the hair covering ventral surface of paramere somewhat sparser than given in the figure); when right paramere is removed and the left one together with penis valve and volsella is seen from inside: Fig. 213, penis valve with apical area on inner-ventral margin minutely serrate and a pair of curved spines at a short distance below there; seen somewhat more ventrally: Fig. 214, structure of volsella well visible.

Vertex finely, very closely punctured, punctures medianly longitudinally and laterally obliquely contiguous to each other, forming puncture-lines, frons microreticulate, under high magnification PIS crossed with very fine impressed lines. Mesoscutum and scutellum also punctate-microreticulate, with PIS crossed with microstriae, but punctures somewhat larger than on vertex; tegula on anterior and inner area finely and closely punctured, on the rest surface smooth and polished; on mesopleuron punctures finer than on scutum and somewhat sparse, with PIS smooth and shining, scrobal furrow sparsely crenate. Dorsum of propodeum coarsely, irregularly rugoso-reticulate, in some light appearing obliquely, in other light transversely rugoso-striate-punctate and in certain condition a feeble longitudinal carina comes to appear near each lateral margin; poste-

rior aspect transversely rugoso-striate in the main, between striae short strioles irregularly crossed, the sculpture not well visible due to close short silvery pile; sides above stigmatal furrow finely and closely punctured, punctures obliquely arranged in lines and anteriorly mixed with a few oblique distinct rugosed striae, below the furrow simply closely punctured, with PIS shining.

Holotype: ♀, specimen E above listed: Shwegyin, Tenasserim, VI. 1898, C. T. Bingham coll. (British Museum - Natural History -).

Paratype: ♂, specimen D above listed (data same as in ♀). (Ditto).

Other specimen: 1 ♂, specimen B above listed: Ataran Valley, Tenasserim, IV.1891, C. T. Bingham (Brit. Mus. Natural History). This is an aberrant specimen (see remarks).

Remarks. The present species is similar in the gastral colouration and in the form of the apical margin of the clypeus to Lyroda japonica Iwata and to L. williamsi n. sp. But differs from both in the apical form of the clypeus in the female (in this character differs also from L. salai Giner Mari and L. nigra (Cameron) also) and, further, from japonica in the structure of the male genitalia (apical character of paramere), in the apical form of sternite 8 and in the much finer and weaker punctation of mesoscutum.

In the form of the female clypeus and in the characters of paramere of the male genitalia it is somewhat close to L. laguna that will later be described, but differs from this in the form of the male clypeus and sternite 8 and in the dentation at the apical part of penis valve. Further, strictly the apical form of the female clypeus is not identical and the punctation of mesoscutum is much weaker than in laguna.

The specimen (B) that is excluded from the type series of the present species is an aberrant, bearing only two cubital cells in both fore wings (Fig. 209). But the fundamental structure of the venation is not deviated from the normal, only the first transverse cubital nervure is disappeared. The measurement of abscissae of radial vein of this specimen has been given in the foregoing page.

THE PHILIPPINE SPECIES

41. LYRODA FORMOSA (SMITH, 1858)

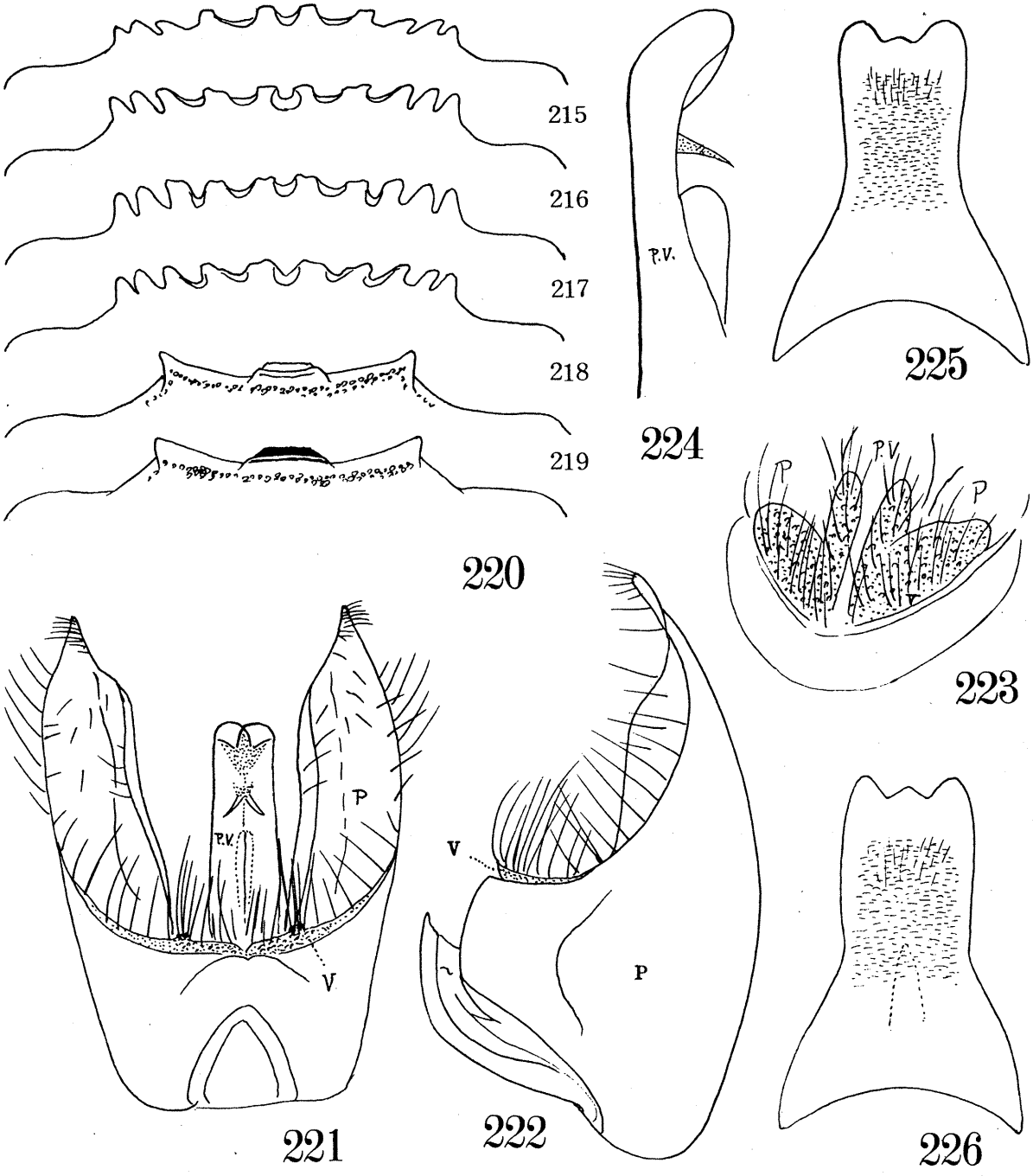
Morphota formosa Smith, J. Proc. Linn. Soc. London, 3(9): 17, 1858 (♀, Celebes).
Lyroda formosa: Kohl, Verh. zool. bot. Ges. Wien, 34(1884): 267, 1885 (listed).
Lyroda formosa: Bingham, Faun. Brit. Ind., I: 209, 1897 (Tenasserim, Sikkim).
Odontolarra rufiventris Cameron, Ann. Mag. Nat. Hist., Ser. 7, 5:24, 1900 (♂, India: Bengal, syn. after Pulawski, 1975).
Lyroda formosa: Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 93, 1928 (35 ♀ 32 ♂, Luzon, Mindoro, Negros).
Lyroda formosa: Pulawski, J. Wash. Acad. Sci., 64(4): 319, 1975 (syn.).
Lyroda formosa: Tsuneki, Steenstrupia, 4: 74, 1976 (Palawan and Tawi Tawi).

Specimens examined: 1 ♂, Luzon, Prov. Laguna, Pagsanjan, 2.IV.1978; 1 ♀, Luzon, Prov. Camarinessur, Baao, 16.VIII.1978; 1 ♂, Luzon, Prov. Launion, St. Fernando, 26. XII.1979; 1 ♀, Luzon, Mountain Prov., Bontoc, 850 m, 29-30.XII.1979; 1 ♀ 1 ♂, Mindanao. Zamboanga, Pasonanca Park, 30-31.VII.1980, all leg. T.Murota. 1 ♀, Tawi Tawi, Tarawakan, north of Batu Batu, 7.XI.1961, Noona Dan Exped., 61-62.

Remarks. Bingham (1897) in his description of the Indian and Burmese specimens says that abdominal segments 1-4 above with broad transverse pruinose bands. In the Philippine specimens before me which agree well with the description and figures of Williams (1928)(but he did not describe nothing about the pile bands), however, the pile bands are confined to GT1-3 only, GT4 is completely without band. But GT5 wholly covered with short whitish silky hair.

Williams gives the figures of the clypeus (♀ ♂) and genitalia (♂), the former is detailed and well agrees with that of the present specimens, but the latter (ventral) is only a general view and can not stand the detailed comparison. So the results of my observations (two specimens examined) are presented here. Seen from beneath: Fig. 221, from right side: Fig. 222, volsella nearly vertically seen: Fig. 223, penis valve from left side: Fig. 224. The structure is very similar to that of venusta (s. nov.), except the smooth head of the penis valve, and simple apex and sparser setae of paramere. The 8th sternite slightly varied between the two: Figs. 225 and 226, but the variation of such a degree is frequently met with in this group of wasps.

Lyroda formosa is morphologically very similar to L. venusta (sens. nov.), but markedly differs in the gastral colouration. In formosa the gaster is always (♀ ♂) bas-



Figs. 215–226. Lyroda formosa (Smith). 215–218 ♀, 219–226 ♂.

ally red, but the extent of the red is more or less variable. G1 and G2 are always red (♀ ♂), but G3 is in ♀ at most basal half only red, usually at base narrowly red and in ♂ completely black at least in the Philippine specimens (according to Pulawski, 1975, types of formosa and rufiventris Cameron have G1-3 red), while in venusta the gaster is completely blacl.

The clypeal form is also similar, at least to that of L. venusta taiwana in ♀. Four instances of Philippine formosa are presented: Figs. 215 (Luzon), 216 (Luzon), 217 (Mindanao) and 217 (Tawi Tawi) (cf. Fig. 198). In the male, however, the curving degree of the apical margin is slightly different between the two species; in the Philippine specimens: Figs. 219 and 220 (cf. Fig. 193).

Comparative measurements of formosa and venusta taiwana (within parenthesis):
♀. HW,HL,IODv,A3=100,52,44,22 (=100,52,45,24). HW,HL,IODc=100,75,52 (=100,75,52).

AOD,WAS,IAD,ACD=5,4,6.5,0 (=5,4,6,0). OOD,Od,POD,OCD=5,3,6.5,12.5 (=5,3,5.5,12). A3,4, 5≒10,7,7 (=10,7,6.5). A3=AW×3(min.) or 3.7(max.) (=AW×3 or 3.8). Length 8.5, 9.2, 9.2, 9.0 mm.

♂. HW,HL,IODv,A3=100,52,51.18 (=100,54,52,18). HW,HL,IODc=100,72,54 (=100,76,53). AOD,WAS,IAD,ACD=5,4,5,0 (=5,4,5,0). OOD,Od,POD,OCD=5,2.5,6,10.5 (=5,2.5,6,10.5). A3,4, 5≒10,8,7 (=10,7.5,7). A3=AW×2.2 or 2.1 (=AW×2.5 or 2.2). Length 6.7, 7.7, 8.5 mm.

Thus the measured values are very closely similar to each other as in their structural and sculptural characters. As to the clypeus, however, besides the curvature of the apical margin in the male the following slight difference is observed: In formosa basal depression of the disc is centered around the tentorial pit of each side and shallowed towards middle (♀ ♂), while in venusta (in ssp. taiwana also) the disc is uniformly depressed at base below sockets of antennae, forming arcuate furrows and the furrows of both sides are almost smoothly connected with each other. As to genitalia of the male compare Figs. 221-224 with Fig. 197, and as to sternite 8 Figs. 225-226 with Fig. 196.

42. LYRODA WILLIAMSI TSUNEKI, SP. NOV.

Lyroda venusta: Williams, Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 94, 1928 (18 ♀, 15 ♂, Luzon, Sibuyan, Samar, figs. of clypeus and genitalia: Figs. 49 and 161).
Lyroda williamsi Tsuneki, SPJHA, 24: 72, 1983.

Remarks. Through the revision of the syntype specimens of Lyroda venusta Bingham it was made clear that the species which was called by Williams (1928) with this species name was not identical with the Bingham's species and so a new name was given to the Williams' species

Among the specimens from the Philippines examined by me in the present study, however, none of this species could be discovered.

43. LYRODA LAGUNA SP. NOV.

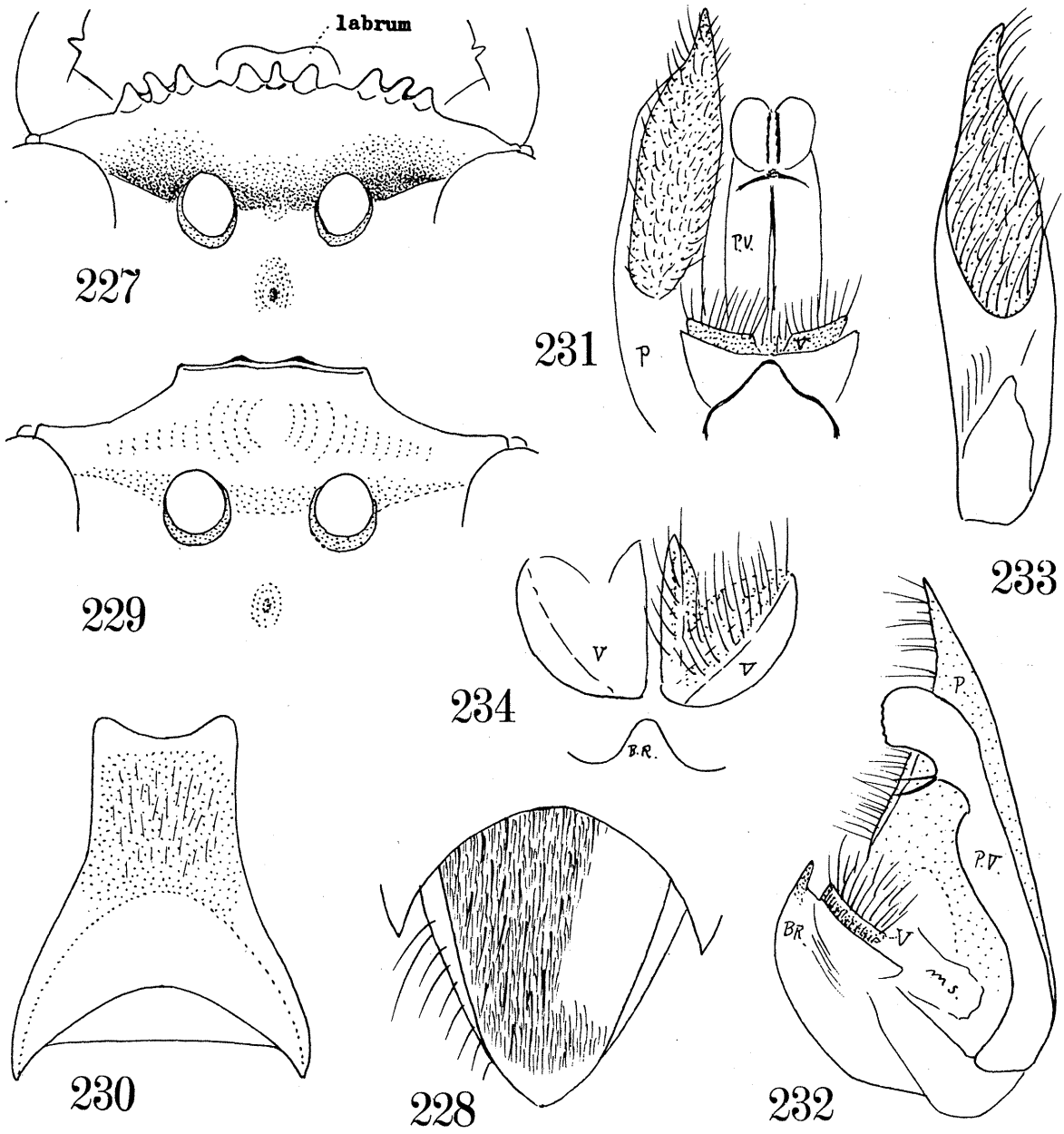
Closely resembles in appearance L. williamsi n. sp. (= L. venusta Williams, 1928, nec Bingham, 1897), but differs from it (♀ ♂) in the form of the apical margin of the clypeus at least and can easily be separated therefrom.

♀. Length 9.0 mm. Black; mandible except extreme base and ventro-outer margin shortly ferruginous, apically broadly castaneous brown, mouth parts dark brown, apical 2 joints of maxillary palpi pale, tegula on outer half and posteriorly pale brown, tibial spurs ferruginous and all T5 with claws considerably brownish. Wings hyaline, apical margin slightly clouded, veins and stigma dark brown. Hair silvery, dense places as usual, on posterior marginal area of mesoscutum with a slight golden tint, on gaster the pile bands are on GT1-3 and on 4 lacking, GT5 broadly and uniformly covered with short brownish pile, dense hair on pygidial area golden, mixed sparsely with sparse, long and whitish hair.

Seen from above HW,HL,IODv,A3=100,52,45,23. OOD,Od,POD,OCD=6,2.5,6,11. Seen in front HW,HL,IODc=100,72,52. A3,4,5=10,7,7. A3=AW×3.3 in all direction. In fore wing abscissae of radial vein: 5≒2<3<1<4, relative length of abscissae 1,2,3,4,5=3,1,2, 4,1. G1 with ratio of length in middle from extreme base to apex and width at basal constriction and at apex: =30,30,9 (=3,3,1). AOD,WAS,IAD,ACD=5,5,6,0.

Frontal furrow fine but distinct, ending at a short tuberculate carina above bases of antennae, clypeus: Fig. 227, showing supra-antennal tubercle and posterior depression apical dentation very characteristic, with 3 sets of 3 teeth and gently produced between lateral and medial sets. Mesoscutum medio-anteriorly distinctly furrowed, parapsidal suture in a short, shining, impressed line, scuto-scutellar furrow strongly foveolate, scutellum more roundly raised posteriorly than in formosa (in which disc almost flat), and provided with a median short, low and shining carina as in this, postscutellum weakly tuberculate in middle similarly, mesopleuron roundly highly elevated at epimeral area (as in formosa), episternal furrow below junction with scrobal furrow much wider and more strongly foveate than in this. Propodeal dorsum without distinct lateral carinae, but lateral areas very coarsely rugoso-reticulate (with meshes subquadrangular) and some of the strong rugae connected longitudinally and appears like a lateral carina or incomplete carinae, but not reaching anteriorly the spiracle and posteriorly beyond mid point of posterior inclination, disc medianly with a distinct carina, reaching close to apical margin; the segment in lateral view dorsal margin longer than posterior margin (about

4:3), forming an angle of about 120°, but the top slightly produced in triangle, rounded at apex, posterior aspect medianly finely grooved, the groove slightly enlarged and roundly deepened at the top, posterior area radiately 5-carinated from the raised thick rim of gastral socket, carinae equidistant, but not reaching upwards till mid height of the aspect, lateral ones of which are the short lateral carinae of the usual sense; the structure is very clearly observed by the scarcity of the silvery hair in this species (in formosa not well visible by the dense hair). Sides with comparatively shallow stig-



Figs. 227-234. Lyroda laguna n. sp. 227-228 ♀, others ♂.

matal furrow, shallowed and broadened posteriorly behind mid point and becomes indistinct. Fore tibia without spine, mid and hind tibiae spinose as in formosa. Basal platform of GT1 subtriangular, wider than long and at basal sides rounded and comparatively broadly open at apex, with margin highly ridged, emitting several short carinae posteriorly, of which inner 3-4 are strong and outer ones located within a small rounded concavity finer, weaker and numerous, surface of the platform medianly longitudinally depressed and inclined towards the furrow and transversely, somewhat coarsely rugoso-stri-

ate. Pygidial area: Fig. 228.

Frons, vertex and dorsal side of thorax strongly micropunctate-reticulate, half mat, mesopleuron very finely and closely punctured, punctures finer than meshes of scutum and weaker, on top of raised epimeral area surface more shining. Dorsum of propodeum on median area comparatively strongly, coarsely and irregularly rugoso-reticulate, from median carina emitted 7-8 transverse subequidistant rugae and they soon turn into irregular network, becoming finer, weaker and indistinct laterally, but at lateral marginal areas again turning into strong network, much coarser and stronger than on median area and, slightly extended over the lateral verges to the upper part of the sides of propodeum; posterior inclination moderately coarsely rugoso-reticulate, but the main coarse of the rugae transverse and at dorso-lateral areas much more strongly and coarsely rugoso-reticulate, on posterior part within the area of 5-carinae surface longitudinally, finely, fairly closely striate; sides above stigmatal furrow obliquely, finely and closely rugoso-striate, striae stronger and coarser upwards, below the furrow finely and fairly closely punctured, without striae and surface shining; gastral tergites very finely and very closely micropunctulate as usual in this genus, on sternites punctures slightly larger and sparser and mixed with a few bristle-bearing strong punctures near apical margin of each segment.

♂. 7-8 mm. Generally similar to ♀, but clypeus: Fig. 229, very characteristic in its apical form, the two gentle prominences not bevelled anteriorly. Measurements: HW,HL,IODv,A3=100,50,48,17. HW,HL,IODc=100,72,52. AOD,WAS,IAD,ACD=5,3.5,5.5,0. A3,4,5=10,9,8.5. A3=AW×2.3-2.5. OOD,Od,POD,OCD=6.5,3,8,13. GT1 with medial length, basal and apical width =30,8,22. Sternite 8: Fig. 230 (external view, dotted line is internal). Pygidial area resembles Fig. 195 in form, margined on each side with a carina and surface covered with brassy hair. Genitalia in ventral view: Fig. 231 (right paramere removed), in lateral view (from right side): Fig. 232 (right paramere removed), penis valve serrate at inner ventral margin of apical part; the removed right paramere seen from inner-ventral side: Fig. 233, characteristic is that the hair-bearing area is distinctly margined with acute edge. Volsella with inner part is not well visible due to hair, but possibly it is consisted of two lobes as given with Fig. 234.

Colouration generally similar to that of ♀, but tibial spurs and all T5 much paler ferruginous. Short pubescence on posterior aspect of propodeum richer, covering fairly closely the surface sculpture. Propodeal dorsum almost uniformly rugoso-reticulate with medium-sized meshes, dorso-medial excavation of posterior inclination broader and shallower, up-turned triangulae in outline and inclined towards the bottom line, 5-carinate area similar in sculpture; on sides of the segment stigmatal furrow finer and shorter, rugoso-striate area above the furrow narrower, confined to anterior part only and posterior area broadly simply punctured. Basal platform of GT1 semicircular in form, surface flat, except medial furrow, and rather finely, weakly rugoso-reticulate.

Holotype: ♀, Luzon, Prov. Laguna, Pagsanjan, 7-9.VIII.1978, T.Murota (Coll. Tsuneki).

Paratype: 2 ♂, same data as holotype (Coll. Murota and Coll. Tsuneki).

III. TRIBE TRYPOXYLONINI

(Excluding the genus Trypoxylon)

44. PISON (KROMBEINIELLUM) BROWNI (ASHMEAD, 1905)

Pisonoides browni Ashmead, Proc. U. S. Nat. Mus., 28: 961, 1905 (♂, Manila).
Pison (Pisonoides) browni: Turner, Proc. Zool. Soc. London, 42: 617, 1916 ("I have not seen this species, which appears to be allied to agilis, but may be distinguished by the striation of the posterior slope of the median segment, which is punctured in agilis").
Pison browni: Baltazar, Pacif. Ins. Monogr., 8: 335, 1966 (listed).
Pison (Krombeiniellum) browni: Bohart & Menke, World Sphecid., p. 337, 1976 (listed).

The present state of the holotype specimen.

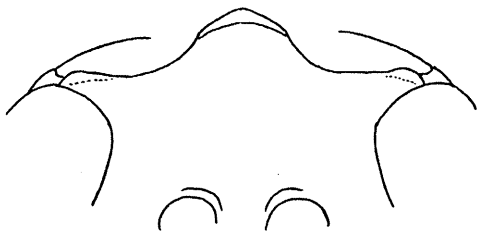
Through the courtesy of Dr. K. V. Krombein, Smithsonian Institution, Washington, D. C., I could observed the holotype specimen of Pisonoides browni Ashmead.

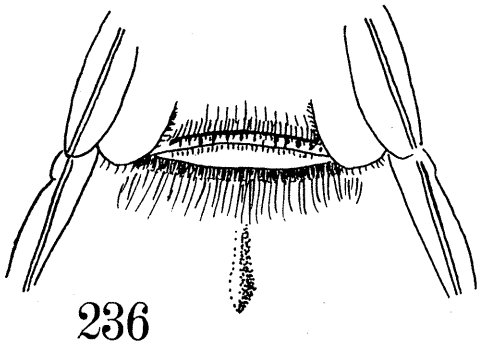
It is a complete male specimen, measuring 6.0 mm (as in the original description) in the state of the curved gaster. It is pinned at middle of the scuto-scutellar suture with a steel black insect needle of No. 2 in thickness, not rusted, with the wings

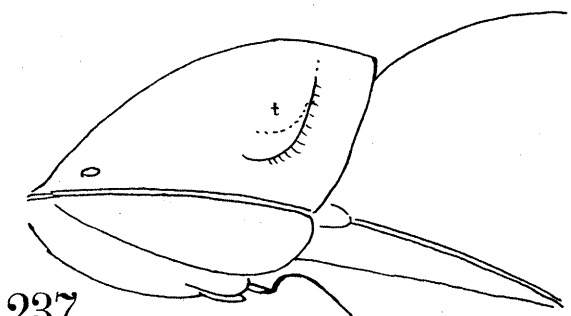
obliquely raised and with the antennae laterally extended, but with the mandibles closed. Four labels are attached: from the top (1) a 4.5×3 mm slit of white paper, with "Manila P I" pressed in 2 lines, (2) 8×3 mm white slit, with "Robt Brown Collector" pressed in 2 lines, (3) 11×8 mm red type label, "♂ Type No. 8332 U.S.N.M." in 3 lines, "♂" and "8332" are handwritten in with black ink, (4) a black framed name label, 16×9 mm, with "Pisonoides ♂ Browni Ash" written in by the hand of Ashmead, ♂ might be added after the name had been written in at an empty place of the left lower corner. No date of collection, even on the back of any label.

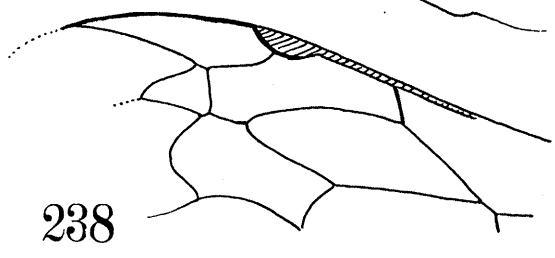
Observation. The specimen is considerably altered in colour as compared with the original description and at present the antennae and the legs are strongly brownish and as to their original condition it can not be presumed. But fore tibia and all T5 are much paler and femora and trochanters much darker, coxae only apically brownish; mandible, tegula and wing veins and stigma pale ferruginous. As to "yellowish" in the original description it is possibly brownish or ferruginous in reality; certainly no yellowish area remains on the tegulae and legs. GT2 and 3 at posterior margin on median area and the exposed basal smooth shining parts of GT3 and 4 ferruginous and the following GT5 also somewhat brownish, all these are possibly faded during preservation. Pubescence on vertex, frons, pro-, mesonotum, scutellum and gaster short, fine, close and greyish white, that on scapal furrow, clypeus, sides of thorax and whole of propodeum thicker, longer and also whitish, on disc of clypeus when vertically seen punctures well visible.

Seen from above HW,HL,IODv,A3=100,50,32,10. Eyes densely covered with short pubescence and the measurement of HW is difficult. Each ocellus in a hollow, hollows of hind ocelli continued with each other, but with an median intervention by low elevation, thus the fine, shining impressed line at posterior margins of hind ocelli medianly interrupted. OOD,Od,POD=4,5,4. Seen in front HW,HL,IODi=100,86,70. IODv,IODi,IODc=10,22,10. Eye incision located at level of mid point of HL, sides rounded and slightly roundly convergent below, widest at slightly above middle of HL; thus frons markedly broad and gently roundly elevated, bearing a fine pitchy black shining line in middle, the line not distinctly impressed, but raised into a short carina at anterior inclination towards bases of antennae; scapal furrow along inner orbit distinct. Clyepus: Fig. 235, rather short, relative length in middle to the length of frons (distance between fore ocellus and base of clypeus) = 44:100, disc strongly roundly elevated in middle, the elevation extended laterally across middle; mandible without notch on onter-ventral margin. Antenna distinctly clavate, narrowest at base of A3 and widest at A11, their relative width = 2:5, relative length of A2,3,4,5,10,11,12,13=12,10,9,8,6,6,6,11. A3=AW×1.7. Collar of pronotum comparatively thick, seen in front roundly (somewhat subtriangularly) raised and gently tuberculate in middle; admedian lines of mesoscutum raised (not impressed) lines, fine, short, shining and divergent, from the interspace till beyond middle of

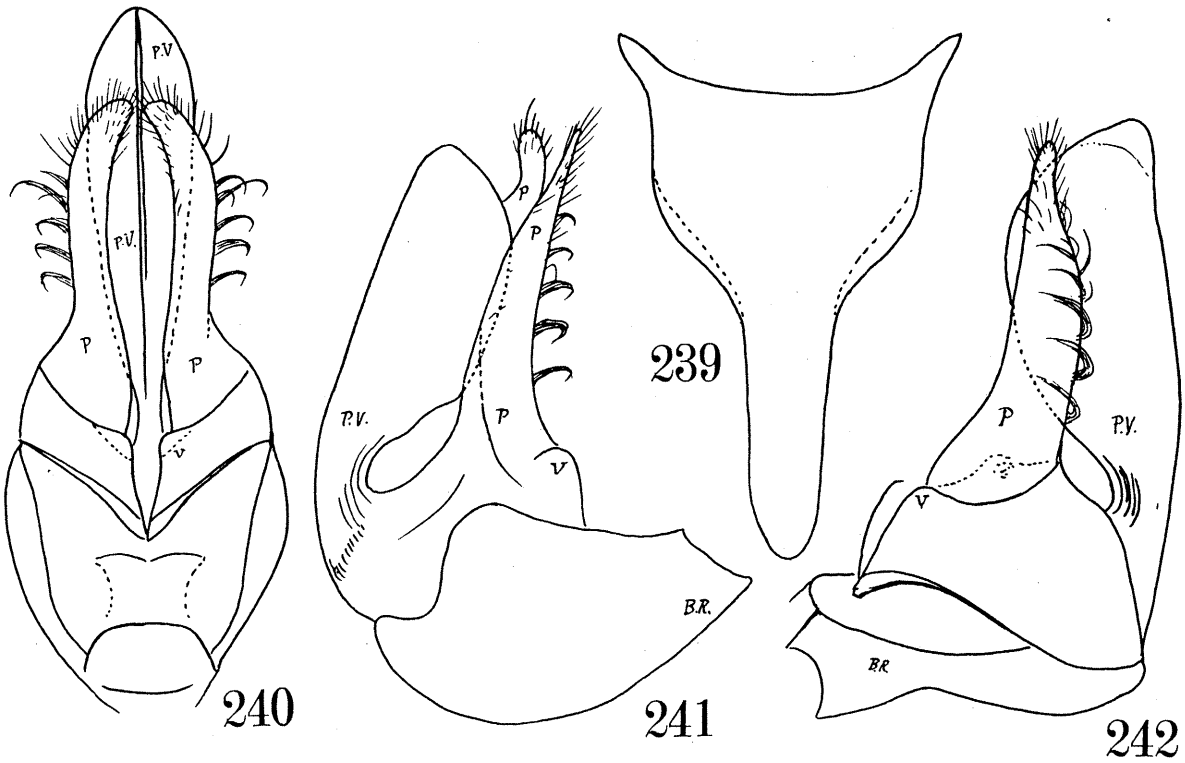








Figs. 235-238. Pison (Krombeiniellum) browni Ashmead, ♂.



scutum surface broadly depressed, the depression slightly longer than wide, parapsidal sutures deeply impressed, short, shining, the areas around the lines also markedly depressed, the depressions are smaller than the medial one, thus mesoscutum bears 3 large longitudinal depression across middle, scutellum without median impression. Mesopleuron with a large and deep scrobe, it narrowly extended anteriorly into scrobal furrow, mesosternal furrow distinct, without acetabular carina. Propodeum without lateral carinae, area dorsalis distinctly enclosed with fine carinae, accompanied inside with a broad, shallow and indistinct furrow, medial furrow broad and distinct and medianly carinate, the carina crenate and accompanied with a crenate furrow on each side, posterior slope medianly with a large, deep hollow, provided in middle with a shining impressed bottom line. Gaster on sides of G1 and 2 acutely carinated, GT1 transversely broadly depressed at apex and provided with a large rounded (somewhat transverse) tubercle near each side and just in front of the depression, on GT2-6 the apical depression weaker and medianly broader, the tubercles also weaker and more transverse, GS1 at apical marginal area depressed, with a transverse impressed line before apex, on each side the margin is covered with a rounded flat expansion protruded from each side of GS1, inner margin of which acutely edged and shortly extended on GS1 as a convergent carina (Figs. 236 - ventral - and 237 - lateral, t .. dorsal tubercle). GS2 at base transversely deeply depressed and at extreme base medianly with a lunate plate just below apical margin of GS1 (Fig. 236), basal depression gradually raised posteriorly and in middle bluntly ridged, the ridge gently tuberculate at end at the centre of the segment (Figs. 236 and 237). Venation of fore wing: Fig. 238. Genitalia not examined.

Vertex around hind ocelli and posteriorly somewhat sparsely covered with medium-sized (somewhat small) punctures, PIS = 1-1.5 times PD and smooth and shining, around fore ocellus and frons finely and very closely punctured, punctures irregularly subcontiguous to each other, but PIS shining, clypeus finely, very closely punctured, punctures on mesoscutum finer than those on vertex and much closer, irregularly subcontiguous to adjacent ones, but PIS not microstriate, shining; on mesopleuron punctures somewhat larger than on vertex and mostly longitudinally closely arranged, PIS≒PD. Tegula of wing finely and closely punctured all over. Disc of area dorsalis of propodeum (upcurved in cross section) smooth and polished and sparsely punctured, punctures fine but larger laterally, and along the enclosing carinae rather coarse, median longitudinal carina with several notches posteriorly and the fine furrow on each side also notched with a series of foveoles that are slightly obliquely elongated. Posterior slope transversely coarsely striate, sides on central area very sparsely punctured with large shallow punctures, on anterior area punctures somewhat smaller, on dorsal area mixed with coarse punctures and shallow weak impressed lines, posteriorly punctures slightly smaller but deeper and some-

what closer and transversely arcuately arranged. GT1 finely, sparsely punctured, with PIS strongly microcoriaceous, GT2 similarly punctured, but with PIS smooth and polished, from GT3 posteriorly more finely and somewhat closely punctured, punctures posteriorly finer and closer. Sternites finely, but slightly more sparsely punctured.

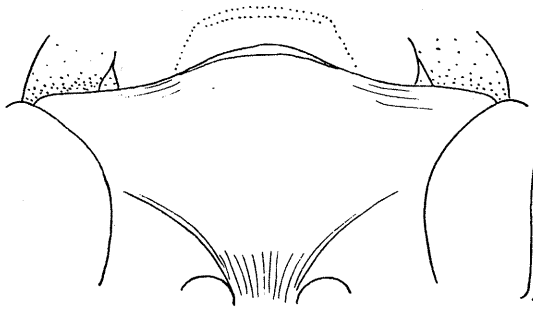
Remarks. Among the specimens newly collected 1 ♂ and 3 ♀ were identified with this species, with which some supplemental description will be tried below:

Specimens newly examined: 1 ♂, Luzon, Mountain Prov., Bontoc, 850 m, 29-30.XII. 1979, T.Murota; 1 ♀, Negros, Mambucal, 2-3.IV.1979, C.Nozaka; 2 ♀, Mindanao, Cagayan de Oro, Makahambus Cave, 15-16.VIII.1980, T.Murota.

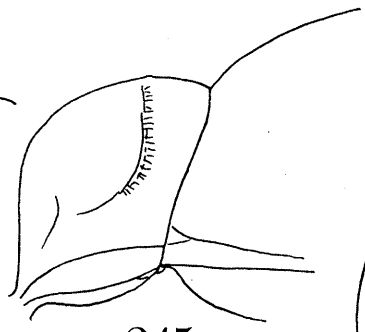
Observation of ♂. Colouration: Black; ferruginous brown are mandible except extreme base, all articulations of legs narrowly, fore tibia (outer side somewhat dark), all tibial spurs and fore T5 largely (peripheral area above slightly dark). Measurement: Length 5.5 mm. Seen from above HW,HL,IODv,A3=100,54,32,10. OOD,Od,POD,OCD=4,4,4,14. Seen in front HW,HL,IODi=100,88,70. IODv,IODi,IODc=10,22,10. A3=AW×1.6. A1,2,3,4,5, 10,11,12,13=16(longest view),10,10,9,8,6,5,5,11.

Sternite 8 seen from ventral side: Fig. 239. Genitalia seen from beneath: Fig. 240, seen from left side: Fig. 241, obliquely from right side: Fig. 242, P ... paramere, P.V. ... penis valve, V ... volsella, B.R. ... basal ring. The form of penis valve and the parameral hair are characteristic.

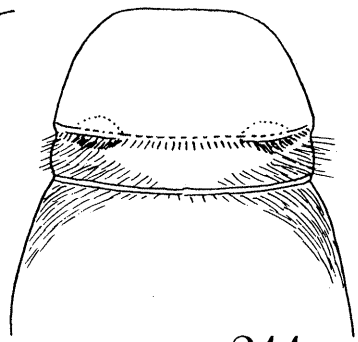
Description of ♀. Length 6.0-6.5 mm. Except sexual characters similar to ♂, but apical margin of clypeus without medial tooth-like prominence, labrum with apical margin gently rounded, subtruncate (Fig. 243), apical marginal area of clypeus (bare and polished) narrower than usual (Fig. 243). Antenna clavate, but A12 markedly attenuate apically. Measurements with one of the Mindanao specimens:



243



245



244

HW,HL,IODv,A3=100,52,27,11. OOD,Od,POD,OCD=3,6,4,13. HW,HL,IODi=100,86,70. IODv, IODi,IODc=10,26,11. A3=AW×2(lateral), =AW×2,2(dorsal). A1,2,3,4,5,10,11,12=13,7,10,8, 7.5,7,6,5,10.5. Relative width at base of A3 and in middle of A11 =4:8.

Otherwise (including wing venation) similar to ♂. G1 and 2: Figs. 244 (dorsal) and 245 (lateral).

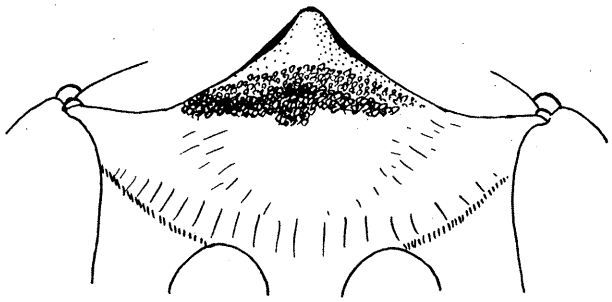
45. PISON (PISON?) MUROTAI SP. NOV.

The present species (♂) is characteristic in the combination of the following distinctions: Two cubital cell in fore wing, gaster ornamented with silvery pile bands, mesoscutum somewhat largely and closely punctured, with PIS microcoriaceous, propodeum with lateral carinae, but carinae not reaching spiracles, area dorsalis not enclosed with furrow or carina, surface somewhat sparsely punctured, without striae (except extreme base), gaster sessile, length 5 mm, legs completely black.

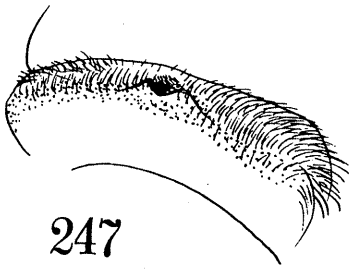
♂. 5.0 mm. Black; mandible on apical half, palpi and posterior part of wing tegula ferruginous brown (spurs of legs black), wings hyaline, apical margin slightly clouded, hair silvery. GT1-4 with a silvery hair band at each apex, the band laterally broader, with hair longer and marked and medianly narrower, with hair shorter, visible in certain light only.

In dorsal view HW,HL,IODv,A3=100,56,28,13. OOD,Od,POD,OCD=2,6,3,14. Each ocellus not in a hollow, but hind one with a fine impressed line along posterior margin, but the two lines not connected with each other, vertex and ocellar area almost smoothly

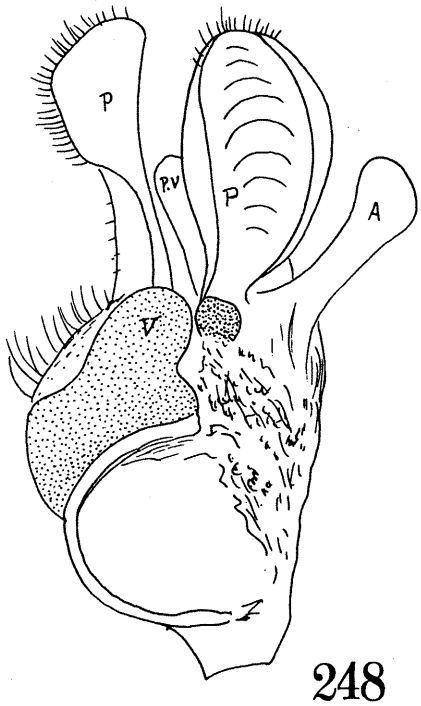
flattened. In frontal view HW,HL,IODi=100,82,71, head with sides slightly roundly convergent below, IODv,IODi,IODc=10,25,14. Clypeus: Fig. 246. A3,4,5,11,12,13=10,8,8,6, 5.7. A3=AW×2.3(dorsal) or AW×2.2(lateral). Occipital carina not reaching buccal carina, with interspace about as long as A3. Pronotal collar with dorsal margin gently roundly elevated and bituberculate in middle, in oblique frontal view: Fig. 247. Parapsidal suture on mesoscutum a short deep impressed line, mesopleural scrobe large, but scrobal furrow fine and shallow, not marked, scutellum with surface flat, postscutellum medianly longitudinally shallowly impressed. Propodeum on dorsum at base and in middle with a smooth, shining T-shaped carina, each arm attenuate distally and length one in broad shallow median furrow and not reaching apical margin, posterior slope with a large hollow in middle, bearing a shining bottom line in middle. G1 and 2 with lateral margins acutely edged and carinated, but on G2 apically blunt and indistinct, each GT at apex broadly depressed as usual, verge to depression apparently bluntly ridged, the ridge slightly swollen before lateral end as usual, in this species swelling not particularly strong and weaker posteriorly. Sternite 1 and 2 structured at base generally as in browni, but the apical margins of lateral lobes smoothly connected with that of medial



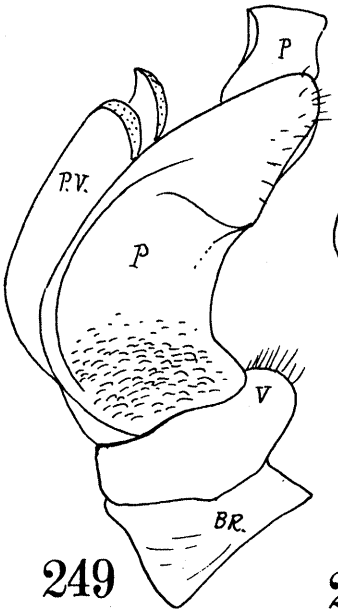
246



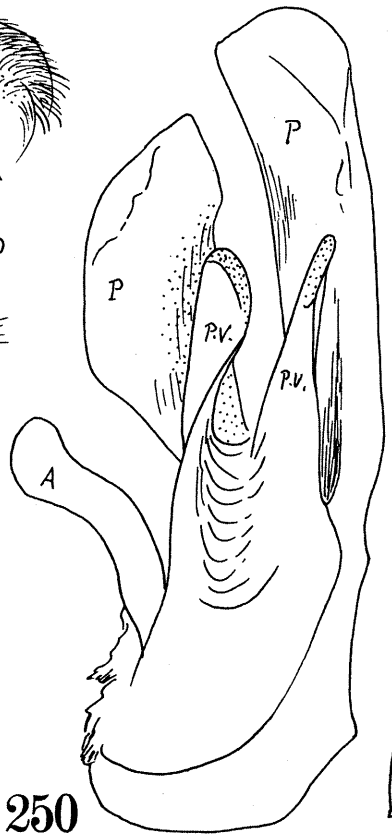
247



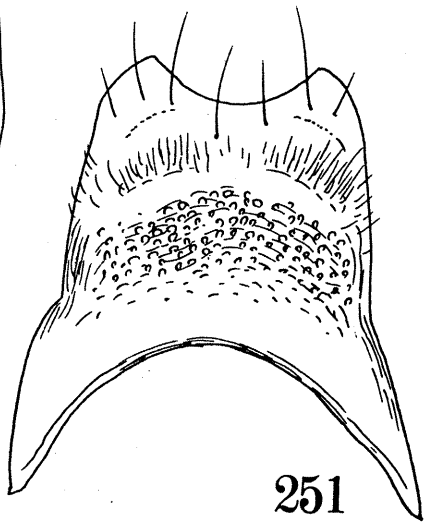
248



249



250



251

area. Genitalia are taken out by dissection, but are heavily disordered and partly destroyed and partly lost (possibly by the collector's trial to pull out when the specimen was mounted). The organs are drawn as they are, without alteration to restrate the original state: Seen from beneath: Fig. 248 (P ... paramere, V ... volsella, P.V. .. penis valve, A ... special appendage). Possibly the left paramere and volsella are in the natural condition, but left special appendage is lost, while the basal ring and anterior part of parameral ring and of volsella of the right side are destroyed and missed, but the special appendage is present here and paramere is markedly altered in form. Seen from left side: Fig. 249 (BR ... basal ring), from dorsal side: Fig. 250, special appendage is produced from basal side of penis valve. This is a very strange organ, not known among the species of Pison (Pison). Sternite 8: Fig. 251. Venation of fore wing much the same as in Fig. 238.

Vertex finely, fairly closely (PIS=PD) punctured, PIS microcoriaceous, punctures on frons much finer and closer, subcontiguous, appearing microgranulate as a whole (PIS indistinct); punctures on mesoscutum larger, sparser (much larger than on vertex), PIS = PD and distinctly microcoriaceous, punctures on scutellum finer, sparser, with PIS feebly microcoriaceous, postscutellum, mesopleuron and propodeum without microreticulation on PIS, smooth and shining, punctures on mesopleuron as large as those on mesoscutum, but sparser, on sides of propodeum slightly finer, sparser, but mixed with weak rugae, dorsum finely and sparsely punctured, only at base and on median furrow along T-shaped carina shortly, obliquely (on median area more transversely) striate, T-shaped carina smooth and polished, posterior slope transversely, arcuately and fairly closely punctate-striate. Gaster finely, fairly closely punctured, without microreticulation all over, puncture finer, closer and weaker posteriorly, GS2 finely and more sparsely punctured than on GT2.

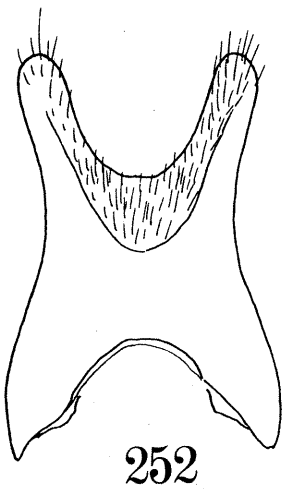
♀, unknown.

Holotype: ♂, Mindanao, Zamboanga, suburbs, 1-2.VIII.1980, T.Murota leg. (Coll. Tsuneki).

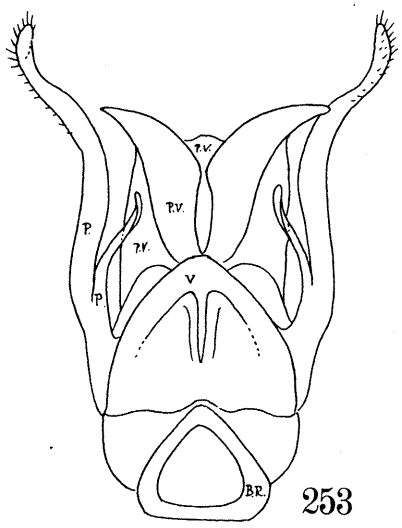
46. PISON (PISON) PUNCTIFRONS SHUCKARD, 1837

Pison punctifrons: Turner, Proc. Zool. Soc. London, 42: 625, 1916 (syn.: suspiciosum Smith, 1858; fabricator Smith,1869; striolatum Cameron, 1896; javanus Cameron, 1905. Distr.: India, Ceylon, Burma, Singapore, Java, Hong-Kong, S. China).
Pison punctifrons: Yasumatsu, Ann. Zool. Jap., 15(2): 236, 1935 (list of ref., n. loco.: Malay Pen., Sumatra, E. China, Formosa, Ryukyus, Japan, Bonin Is.).
Pison punctifrons: Krombein, Proc. Hawn. Ent. Soc., 13(3): 400, 1949 (n. syn.: lagunae Ashmead, 1904; n. loco.: Philippines, Guam, Hawaii, Marshall Is., Mariana Is., Caroline Is.).
Pison lagunae Ashmead, Proc. U. S. Nat. Mus., 28: 131, 1904 (♂, Luzon: Laguna de Bay).
Pison punctifrons: Tsuneki, Etizenia, 22: 20, 1967 (Formosa)
Pison punctifrons: Bohart & Menke, World Sphecid., p. 336, 1976 (n. syn.: japonicum Gussakovskij, 1937).

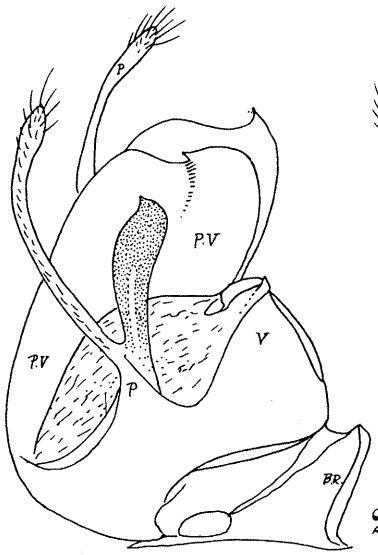
Specimens examined: 12 ♀ 6 ♂, Luzon: Prov. Laguna, LaUnion, Albay, 27.III. - 1.IV.1978; 7-19.VIII.1979; 26.XII.1979 - 5.I.1980, T.Tano(2♀); T.Murota(12♀6♂).
1 ♀, Cebu (Argao), 31.III.1979, C.Nozaka.
1 ♂, Negros (Taytay beach), 4-5.IV.1979, H.Kurokawa.
1 ♀, Leyte (Tadobaz), 15.IV.1982, T.Tano.
1 ♀, Samar (Basey), 21.IV.1982, T.Tano.
7 ♂, Mindanao (Davao, Zamboanga, Cagayan de Oro), 1-15.VIII.1980, C.Nozaka(5♂), T.Murota(2♂).


252

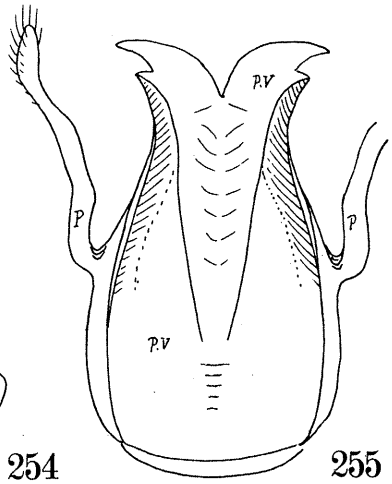
Remarks. In SPJHA, 19: 43 for comparison with a very similar species, P. bismarckianum Tsuneki I gave figures of male genitalia and sternite 8 of this species. Here I again show them with a Philippine specimen for comparison. Sternite 8: Fig. 252, apical emargination comparatively deep, resulting long arms. Genitalia: Figs. 253 (ventral), 254 (lateral) and 255 (dorsal). Penis valve (P.V.) markedly large and broad and characteristic in form, paramere (P) bifid near base



253



254



255

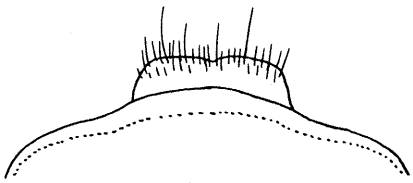
into two branches, a long slender and partly pubescent lobe and a shorter, flat, broad and blackish lobe (Figs. 253, 254, especially 254), volsella (V) not well developed, but large and corn-shaped.

47. PISON (PISON) KOHLII BINGHAM, 1897

Pison kohlii Bingham, Fauna Brit. Ind., Hym., I: 220, 1897 (♀, Burma).
Pison aureopilosus Cameron, Soc. Entom., 24: 73, 1909 (Borneo).
Pison kohlii: Turner, Proc. Zool. Soc. London, 42: 624, 1916 (listed).
Pison (Pison) kohlii: Bohart & Menke, World Sphecid., p. 336, 1976 (listed, syn.).

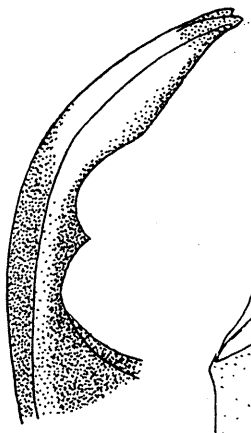
Specimens examined: 3 ♀ 4 ♂, Luzon:
1 ♀, Laguna Prov., Los Banos, Botanical Garden, 30.III.1978, T.Tano; 1 ♀ 1 ♂, same place, 29-31.III.1978, T.Murota; 1 ♀, same place, 2-5.VIII.1978, T.Murota; 3 ♂, Asin Spa, 16 km from Baguio, about 600 m h., 29.III.1978, 5.I.1980, T.Murota.

Remarks. Clypeus in ♀: Fig. 256, in ♂: Fig. 257 and mandible in ♂: Fig. 258.
Punctuation on mesoscutum in the original description: "very finely and closely punctured", while in the Turner's comment: "almost obsolete punctuation", but Cameron says in his description of aureopilosus "closely, regularly and somewhat strongly punctured". In the present Philippine specimens: finely and closely, but distinctly punctured and PIS PD, surface microcoriaceous and half mat. Punctures on frons and scutellum similar to those of mesoscutum, with PIS microreticulate, while on vertex and mesopleuron punctures somewhat sparser and the microst iae on PIS much weaker and surface fairly shining; postscutellum much more finely and closely punctured than scutellum. Gaster above very finely and fairly closely punctured, with PIS very feebly, almost obsoletely microstriate; gaster beneath similar, but punctures sparser.
This species is characteristic in having dense golden pubescence.
Measurements (within parenthesis ♂): From above HW,HL,IODv,A3=100,43,23,14 (= 100,49,28,14). Seen in front HW,HL,IODi=100,86,70 (=100,88,71). IODv,IODi,IODc=10,31, 17 (10,27,16). OOD,Od,POD,OCD=2,6,3,13 (=2,5,3,10). A3,4,5=10,7,6. A3,4,5,12,13=10,6, 5.5,4.5,8.5 (♂). A3=AW×2.5 (=AW×2.3).
Genital organs of ♂: Fig. 259 (ventral), Fig. 260 (lateral) and Fig. 261 (dorsal). Penis valve very large and broad (P.V.); paramere (P) simple, slender and long in ventral view, but considerably broad in lateral view (Fig. 260) and long pubescent at apex. Sternite 8: Figs. 262 (latero-ventral) and 263 (more lateral). Very characteristic in form, especially the hook-shaped apical arms, main body strongly swollen at central area and here blackish, in front of the swollen area constricted and seen from beneath the sides deeply roundly excavated, in lateral view ventro-lateral margin acutely edged and carinated.

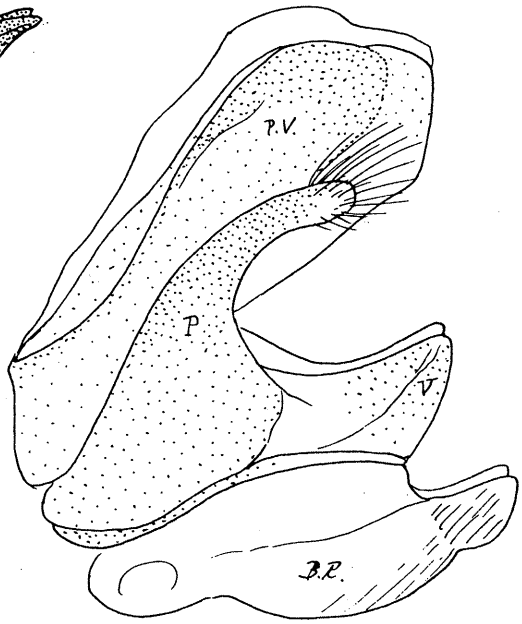


256

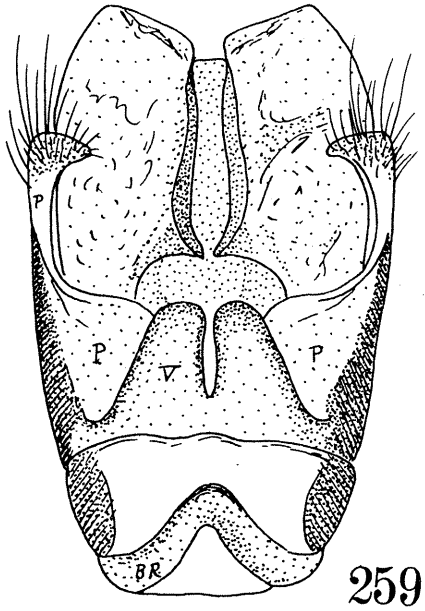
257



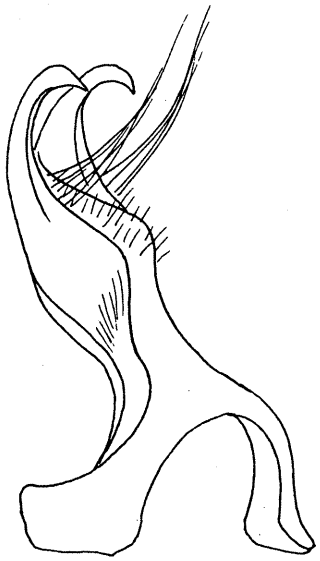
258



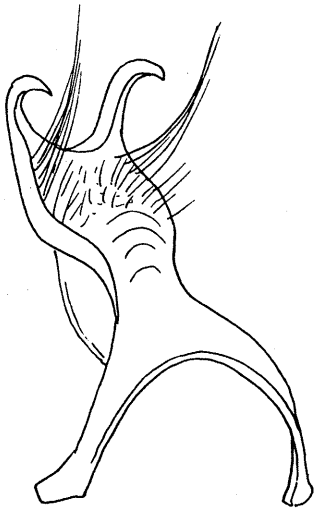
260



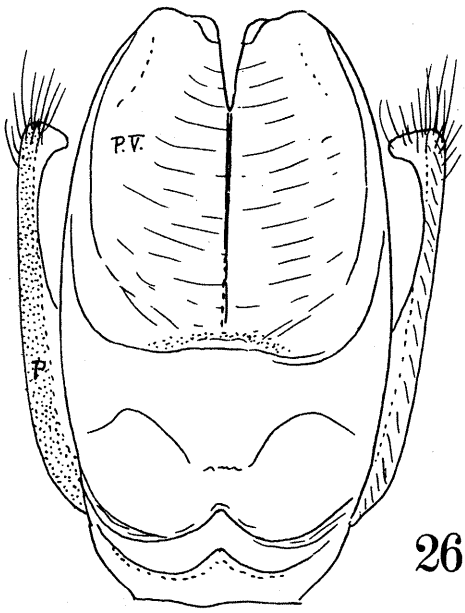
259



263



262



261

Figs. 256 - 263.
Pison (Pison) kohlii Bingham.
256 ♀, others ♂.
256-257 clypeus, 258 mandible,
259-261 genitalia, 259 ventral,
260 lateral, 261 dorsal,
262-263 8th sternite.

48. PISON (PISON) ARGENTATUM SHUCKARD, 1837

Pison (Pisonitus) argentatus Shuckard, Trans. Ent. Soc. London, 2: 79, 1837 (♀, Mauritus)
Pison fuscipalpis Cameron, Proc. Zool. Soc. London, 2: 27, 1901 (♀, Singapore).
Pisonitus argenteus Ashmead, Proc. U. S. Nat. Mus., 28: 131, 1904 (♀, Philippines).
Pison argentatus: Turner, Proc. Zool. Soc. London, 42: 619, 1916 (syn. distr.).
Pison argentatus: Swezey, B. P. Bishop Mus. Bull., 172: 185, 1942 (Guam).
Pison argentatus: Krombein, Proc. Hawn. Ent. Soc., 13(3): 403, 1949 (Mariana Is., Caroline Is.).
Pison (Pison) argentatum: Bohart & Menke, World Sphecid., p. 335, 1976 (listed).

Specimens examined: 20 ♀ 15 ♂, Luzon: Baguio, 26-31.III.1978, C.Nozaka(5♀2♂), T. Tano(2♀1♂), T.Murota(5♀2♂); Los Banos, 2-5.VIII.1978, T.Murota(2♀7♂); Mountain Prov., Bontoc, 29-30.XII.1979, T.Murota(6♀3♂).

1 ♀ 1 ♂, Cebu: Cantabaco, 30.III.1979, H.Kurokawa(1♀), C.Nozaka(1♂).

1 ♀ 6 ♂, Leyte: Tacloban and Basey Sanar, 15-22.IV.1982, T.Tano(1♀,Tacloban).

6 ♀ 14 ♂, Mindanao: Davao, Cagayan de Oro and Zamboanga, 3-17.VIII.1980, T.Tano(1 ♀), C.Nozaka(2♀4♂), T.Murota(3♀9♂).

Remarks. As pointed out by Krombein (1949) this species is distinguished from the closely allied species, P. ignavum, by the weaker, closer and more indistinct striation of dorsum of propodeum (♀ ♂) and by the lack of medio-apical depression of the clypeus (♀) etc. In addition to these, eye incision are in the present species distinctly more widely open towards frons than in ignavum (♀ ♂). In the structure of the male genital organs both the species are very similar to each other, but generally in the present species (4 specimens examined) the structure is less robust than in ignavum (6 examined): Figs. 264 (lateral), 265 (dorsal), 266 (ventro-lateral), cf. Figs. 268 (lateral), 269 (dorsal), 271 (ventro-lateral) in ignavum. In the figures, P - paramere (m - membraneous lamella, this is thinner than in ignavum), P.V. - penis valve, V - volsella (not well developed), B.R. - basal ring. Sternite 8 also somewhat slenderer: Fig. 267, 273.

Measurements, ♀ (♂ within parenthesis): HW,HL,IODv,A3=100,48,31,15 (=100,53,34,13). HW,HL,IODi=100,90,69 (=100,88,69). IODv,IODi,IODc=10,24,13 (=10,22,13). A3,4,5=10,10.5, 10.5 (=10,11,11), A11,12 (A12,13) relatively =5.5,8 (=7,10). A3=AW×2.8 (=AW×1.8). OOD, Od,POD,OCD=3,5,3.5,11 (=3.5,5,3.5,11).

49. PISON (PISON) IGNAVUM TURNER, 1908

Pison ignavum Turner, Proc. Zool. Soc. London, 30: 511, 1908 (♀ ♂, Australia).
Pison argentatum ignavum: Turner, Ibid., 42: 601, 1916 (Australia and Fiji).
Pison ignavum: Krombein, Proc. Hawn. Ent. Soc., 13(3): 404, 1949 (1 ♂, Caroline Is.).
Pison ignavum: Tsuneki, Steenstrupia, 4: 95, 1976 (Philippines: Tawi Tawi).
Pison ignavum: Tsuneki, SPJHA, 19: 36, 1982 (5 ♀ 6 ♂, Bismarck Arch.: Lavongai Is., full list of reff. figs. clypeus - ♀ ♂ -, wing venation, genitalia and GS8).

Distribution: Australia, Fiji, Tachti, New Caledonia, Caroline Is. Philippines and Formosa.

Specimens examined: 38 ♀ 36 ♂, Luzon: Los Banos (Pr. Laguna), 2-5.VIII.1978, H. Kurokawa(2♀15♂), T.Murota(21♀9♂); Pagsanjan (Pr. Laguna), 7-9.VIII.1978, T.Murota(1♀1♂); Tabaco (Pr. Albay), 19.VIII.1978, C.Nozaka(2♀3♂), T.Murota(1♀2♂); Naga City (Pr. Camarinessur), 14.VIII.1978, C.Nozaka(4♀3♂); Baao (Pr. ditto), 16.VIII.1978, C.Nozaka(2♀1♂); Naguilian (Pr. Launion), 4.I.1980, T.Murota(1♀).

6 ♀ 2 ♂, Leyte: Tacloban, 15, 22.IV.1982, T.Tano.

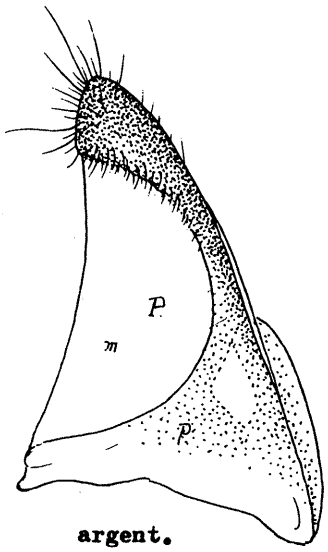
1 ♂, Samar: Besey, 21.IV.1982, T.Tano.

3 ♀, Cebu: Argao, 31.III.1979, H.Kurokawa(2♀); Mactan Is. near Cebu, 28.III. 1979, T.Tano.

4 ♂, Negros: Taytay beach, 4-5.IV.1979, T.Tano(2♂), C.Nozaka(2♂).

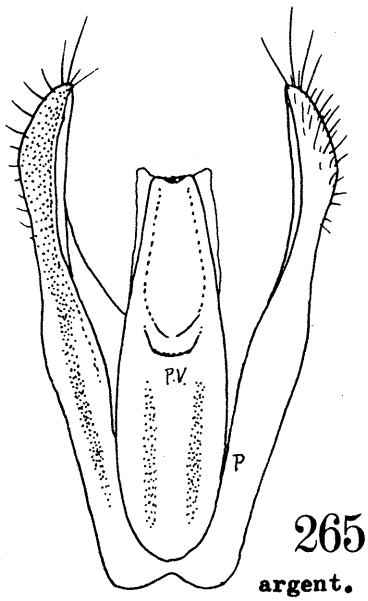
8 ♀ 12 ♂, Mindanao: Zamboanga, 1-2.VIII.1980, T.Murota(2♀5♂); Davao, 3-10.VIII. 1980, C.Nozaka(1♀2♂), T.Tano(1♀), T.Murota(2♀2♂); Cagayan de Oro, river side, 17. VIII. 1980, T.Murota(2♀1♂), C.Nozaka(1♀); Bukidnon, Malaybaley, 12.VIII.1980, C.Nozaka(1♂).

Remarks. General characters of the Philippine specimens are well consistent with those of the specimens of the Bismarck Archipelago given in some detail in SPJHA,19. The The differences from the closely allied species, argentatum, are as given in connection with this species. Genitalial structure is also similar to that of the Lavongai specimens, but here for comparison with that of argentatum figures of lateral, dorsal and ob-



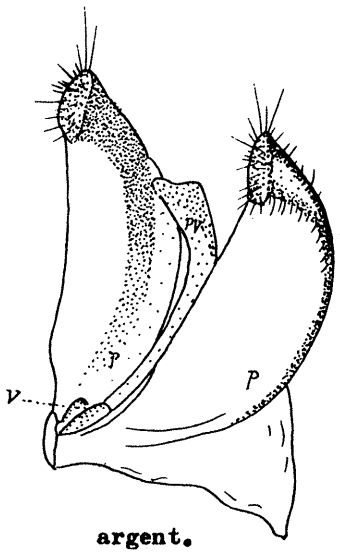
argent.

264



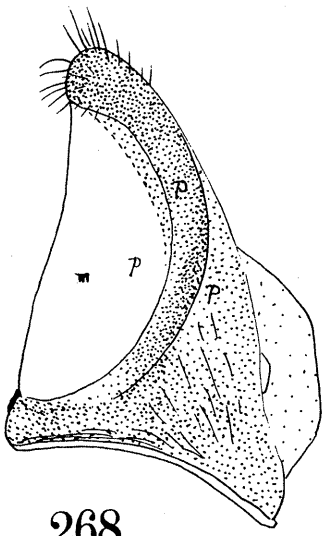
265

argent.

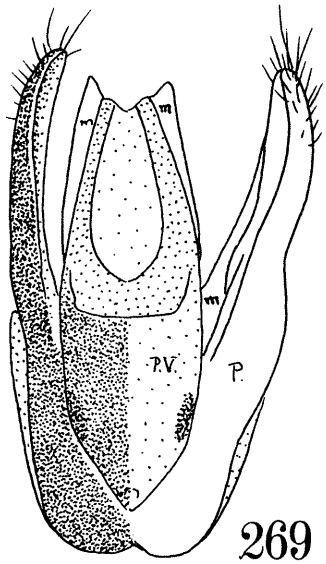


argent.

266

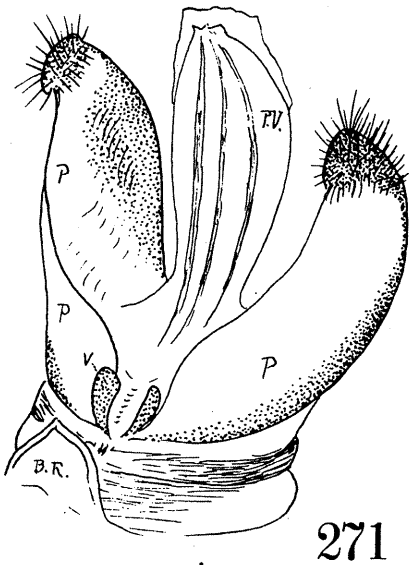


268 ignav.



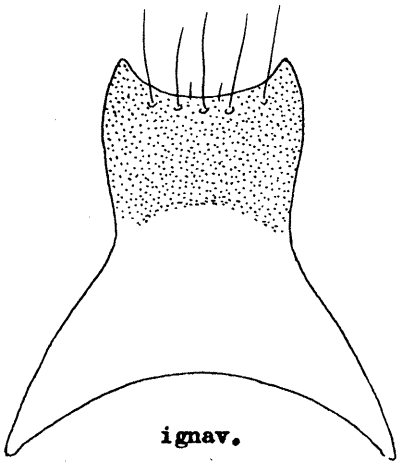
269

ignav.



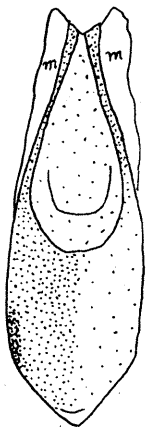
271

ignav.

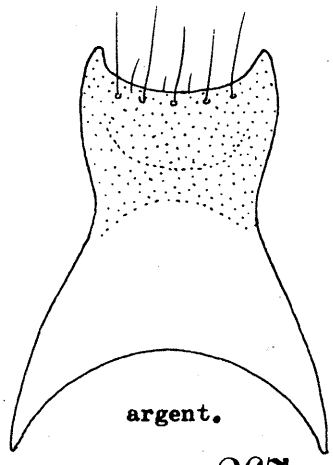


ignav.

272



ignav. 270



argent.

267

lique ventral views are given: Figs. 268, 269 and 271, cf. Figs. 264, 265 and 266. In lateral view with the posterior (or dorsal) well chitinized part more rounded at the top than in argentatum and not so narrowed at the median area as in this. The membraneous lamella (m) is somewhat thicker than in argentatum and general appearance is also somewhat robuster (Fig. 271, cf. Fig. 266). In both volsella is not well developed, but in ignavum it stands upright, while in argentatum it lies backwards. Penis valve is provided with a membraneous rim on each side on apical half which is varied in form according to the condition at the dessication. Apical convergency of penis valve in dorsal view also more or variable (Figs. 269, 270). Sternite 8 is very similar in form and structure to that of argentatum. Strictly, however, in the present species it is relatively wider and less strongly constructed than in argentatum (Fig. 272, cf. Fig. 267). Apical hair of sternite 8 is always less in number and the state of hair given in Fig. 63 of SPJHA, No. 19 is not correct.

Measurement (within parenthesis ♂): HW,HL,IODv,A3=100,48,28,15 (=100,56,34,13). HW,HL,IODi=100,88,70 (=100,87,72). IODv,IODi,IODc=10,25,13 (=10,23,12). A3,4,5,11,12= 10,10.5,10.5,5.5,8 (=10,10,9.5,6,10)(in ♂ last two are A12,13). A3=AW×2.7 (=AW×2.5). OOD,Od,POD,OCD=3,5.5,3,11 (=2,3,2,8).

Pison argentatum and P. ignavum seem to be fairly common in the Philippines, judging from the number of the specimens collected by the members of the Fukui Party.

50. PISON (PISON) ASHMEADI TURNER, 1916

Pison punctulatus Ashmead (nec Kohl, 1883), Proc. U. S. Nat. Mus., 28: 960, 1905 (♂, Philippines).
Pison ashmeadi Turner, Proc. Zool. Soc. London, 42: 625, 1916 (nom. nov.).
Pison ashmeadi: Baltazar, Pac. Ins. Monogr., 8: 335, 1966 (listed).
Pison (Pison) ashmeadi: Bohart & Menke, World Sphecid., p. 335, 1976 (listed).

Dr. K. V. Krombein, Smithsonian Institution, Washington, D. C., kindly gave me the chance to reexamine the holotype specimen of this species. First I will try to redescribe it.

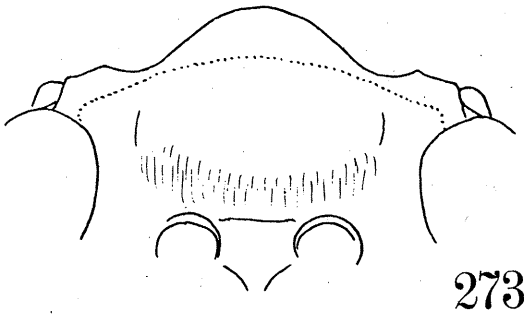
The present state of the holotype specimen (♀! nec ♂):

It is a complete specimen, measuring 7 mm in length, with the gaster well extended, with the wings obliquely raised and the antennae laterally opened, but with the mandibles closed and the legs folded under body; almost unchanged in colour, only GT3,4,5 slightly brownish at apical margins and antennae apically beneath also brownish; mandible except outer basal triangular punctate area ferruginous, tegula and wing veins (except costa and subcosta) and stigma dark brown. The specimen is pinned at mesoscutum with a 38 mm steel insect pin of No. 2 in thickness, black in colour, not rusted. Four labels, each same in size and colour etc as that of browni, lettering from the top label: (1) Manila P I, pressed in two lines, (2) Robt Brown Collector, pressed in 2 lines, (3) ♂, Type No. 9333 U.S.N.M. in 3 lines, ♂ and 9333 are handwritten in, others pressed, (4) Pison puntulatus Ash in 3 lines, written possibly by the hand of Ashmead with black ink. But in reality the specimen is a female.

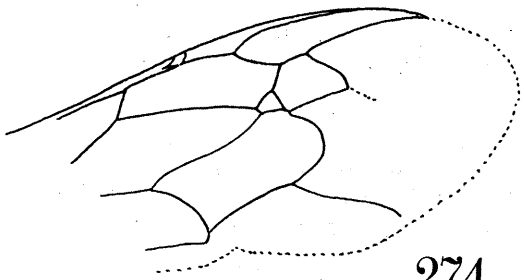
Turner at the time of his renaming the species annotated that "I can not identify this species". According to the collected specimens before me this species is widely common in the Philippines, close to the group of irridipenne - korrorense, but differs from either of them.

Redescription of the holotype specimen. ♀. Seen from above HW,HL,IODv,IODi=100, 52,21,76, A3 relatively 16, frons roundly swollen, occipital margin gently roundly emarginate, ocelli in an equilateral triangle, the anterior slightly smaller than the posterior and inclined forwards, OOD very narrow, OOD,Od,POD,OCD=1,7,3,17 (measured at outer margin of ocellar elevation) or =2,6,5,20 (measured at outer margin of pupil, excluding black outer periphery), ocellar area flattened and raised posteriorly to form a transverse mound between eyes which is inclined towards inner orbits and occipital margin (from level of posterior margin of eyes). Seen in front HW:HL=100:93, IODv,IODi,IODc= 10,37,20, IODi located distinctly above mid level of HL. Frons gently raised, with surface almost flat and strongly and deeply inclined towards bases of antennae, at anterolateral areas deeply excavated by scapal furrows, from anterior ocellus a fine and shallow median groove runs down, but from below middle it is replaced with a carina which is subtuberculated on top, then after once narrowed and weakened, at anterior inclination again strengthened to a distinct carina, but not reaching apex of the inclination. Clypeus: Fig. 273, disc broadly roundly elevated, medio-apical roundly produced area glab-

rous, slightly brownish, fairly shining, but surface not polished, but with delicate microsculpture. AOD:WAS:IAD≒1:1:1, supraclypeal area pentagonal, inserted into interantennal space. Antenna not claviform, gradually widened towards middle and thence gradually narrowed apically, relative length A2-12=4.5,10,10,9.5,9,8,7.5,7,6,5.5,8.5. Maximum width at A8. A3≒AW×2.5. A8-12 flattened beneath, especially marked on A12, hence seen from side A12 is acutely narrowed apically and almost pointed at apex. Collar of



273



274

pronotum transversely ridged on top and inclined deeply towards nape and shallowly towards pro-mesonotal furrow, the ridge slightly wider laterally, seen in front the dorsal margin gently triangularly raised and comparatively broadly flattened or slightly emarginate in middle, mesoscutum smoothly rounded, parapsidal sutures normal, each a short impressed line, admedian lines slightly divergent posteriorly and notauli are short shining black lines, scutellum roundly, not deeply depressed at centre, in some light it appears like a broad shallow median furrow, deeper posteriorly, but not reaching base and apex, postscutellum transversely ridged and feebly incised in middle, the ridge is subtriangular in sagittal section, with top bluntly rounded, on mesopleuron episternal and scrobal furrows distinct, the latter including a large scrobe in middle, there is a short, broad, strongly foveate V-shaped furrow in front of mesocoxa. Dorsum of propodeum without lateral carinae, but with weak lateral furrows, not reaching spiracles, outer edge of which appears in some light like a weak carina, area dorsalis not enclosed with groove or carina, but medianly broadly and shallowly furrowed and finely carinated in middle, the carina attenuating and reaching posterior margin, posterior inclination medianly furrowed as usual, with a fine shining bottom line in middle and with lateral carinae, fine and weaker upwards, but reaching top of the inclination. GT1-5 each with lunate depression before apical margin, its curved anterior margin swollen into 2 gentle tubercles at mid point of each lateral half, the swellings are most marked on GT2 and next on GT1 and 3, thence weaker posteriorly; GS1 broadly, roundly emarginate at apical margin where baso-medial small elevation of GS2 observed. In fore wing radial, cubital and discoidal cells are as in Fig. 274.

Black; mandible apically broadly and tegula on posterior part brown, palpi very feebly brownish, tibial spurs black. Hair silvery, on clypeus not so dense and soft as in argentatum-ignavum group, on gaster apical margins of GT1-5 adorned with silvery hair bands.

Vertex behind hind ocelli finely, closely punctured, PIS mostly 0.5-1 times PD and distinctly microcoriaceous, on the areas around hind ocelli, especially in front of them punctures somewhat sparser, with microsculpture weaker and surface more shining, on frons punctures slightly larger, PIS similarly 0.5-1 times PD, with microreticulation stronger (apparently microgranulate) and surface almost mat; clypeus closely, more finely punctured, on anterior slope mixed irregularly with larger punctures. Mesoscutum and scutellum punctured and microreticulate as on vertex behind hind ocelli, surface half mat. Mesopleuron more largely and somewhat more sparsely punctured, with PIS more weakly and slightly more largely microreticulate, with surface more shining, but punctures on epimeral area as large as those on mesoscutum; dorsum of propodeum at base obliquely, strongly and coarsely striate, but the strong striae are confined to the basal area only, soon they become feeble and indistinct and replaced with medium-sized punctures, puncture-interspaces larger than puncture-diameter and smooth and polished, but on lateral and hind-marginal areas mixed with fairly strong oblique striae, on median furrow, besides median carina, obliquely, coarsely striate and punctate; posterior inclination somewhat more coarsely, transversely striate and punctate; sides obliquely, closely striate and punctate, striae stronger on dorsal portion. Gaster closely covered with very minute piliferous punctules, with PIS very feebly microreticulate, punctures somewhat

sparse on ventral side.

Specimens newly examined:

28 ♀ 25 ♂, Mindanao: 8 ♀ 7 ♂, Zamboanga, 1-2.VIII.1980, T.Tano(1♀), T.Murota(7♀7♂) 7 ♀ 3 ♂, Davao, 3-10.VIII.1980, C.Nozaka(4♀2♂), T.Murota(3♀1♂); 5 ♀ 4 ♂, Mt. Apo (700-1000 m, North Cotabato; 1500 m, near lake Agko), 7-9.VIII.1980, T.Tano(4♀4♂), T.Murota(1♀) 1 ♀ 1 ♂, Bukidnon (Malaybalay, 700 m), 12.VIII.1980, T.Murota(1♀), T.Tano(1♂); 7 ♀ 10 ♂, Cagayan de Oro, Makahambus Cave, 15-16.VIII.1980, C.Nozaka(2♀4♂), T.Murota(5♀6♂).

5 ♀ 8 ♂, Negros: 4 ♀ 7 ♂, Taytay beach, 4-5.IV.1979, T.Tano(3♀1♂), C.Nozaka(1♀2♂), H.Kurokawa(4♂); 1 ♀ 2 ♂, Mambucal, 2-3.IV.1979, T.Tano(2♂), H.Kurokawa(1♀).

2 ♂, Cebu: Cantabaco, 30.III.1979, C.Nozaka.

1 ♀, Leyte: Tolosa, 17.IV.1982, T.Tano.

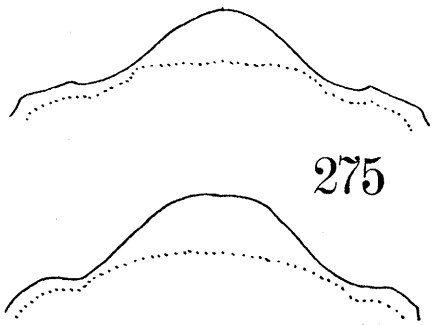
1 ♂, Samar: Basey, 21.IV.1980, T.Tano.

36 ♀ 21 ♂, Luzon: Prov. Laguna: 14 ♀ 2 ♂, Los Banos (including Mt. Makiling, Botanical Garden and village), 29-31.III.1978, T.Murota(7♀1♂), C.Nozaka(2♀), T.Tano(5♀1♂); 6 ♀ 4 ♂, Pagsanjan, 1-2.IV.1978, T.Murota(3♀1♂), T.Tano(2♀3♂); 7-9.VIII.1978, T.Murota (1♀); 2 ♀ 1 ♂, Naguilian, near Baguio, 26-28.III.1978, C.Nozaka(2♀); 4.I.1980, T.Murota (1♂); 2 ♀ 3 ♂, Alaminor, Hidden Valley Spring, 3-4.IV.1978, T.Tano(1♂), T.Murota(1♀2♂); 6.VIII.1978, T.Murota(1♀). Prov. Albay: 3 ♀ 1 ♂, Tabaco, 19.VIII.1978, C.Nozaka(1♀), T.Murota(2♀1♂); 1 ♂, St.Domingo, 17.VIII.1978, C.Nozaka. Prov. Mountain: 1 ♀ 3 ♂, Asin Spa, 16 km from Baguio, 2,5.I.1980, T.Murota; 8 ♀ 5 ♂, Baguio, Mines View Park, 1500 m, 1-3.I.1980, T.Murota; 1 ♂, Bontoc, 850 m, 29-30.XII.1979, T.Murota.

Remarks. Variation in characters in ♀.

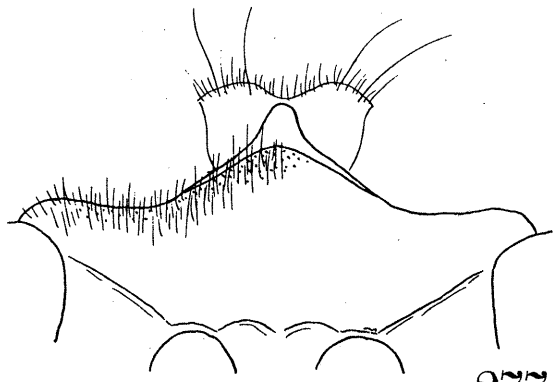
(1) Form of apical margin of clypeus. The forms frequently met with are Figs. 275 and 276 and many intermediate forms are also present.

(2) Punctuation on frons. Most usually punctures fine, but deep and distinct, with PIS strongly microreticulate. Sometimes, however, punctures fine, shallow and indistinct, while the microreticulation strong as usual, as a result surface appears simply microgranulate, without puncture. Of course various intermediate states are present.



275

276



277

(3) Lateral carinae of propodeum. In most specimens carinae are lacking, but sometimes distinctly carinated and in the well develo ed instances accompanied with a coarse-foveated furrow just inside. The carinae are, however, not reaching the spiracles anteriorly. Posterior aspect usually without lateral carinae, but more frequenly present as compared with dorsal aspect.

(4) Sculpture on dorsum of propodeum. Fundamentally as in the type specimen, but sometimes the oblique striae on the disc considerably strong and distinct, but always mixed with distinct punctures. In every case striae and punctures are stronger towards sides and the areas near median furrow are more weakly and sparsely punctured and striated than on lateral areas, sometimes completely without striae and only very feebly and very sparsely punctured, with surface shining.

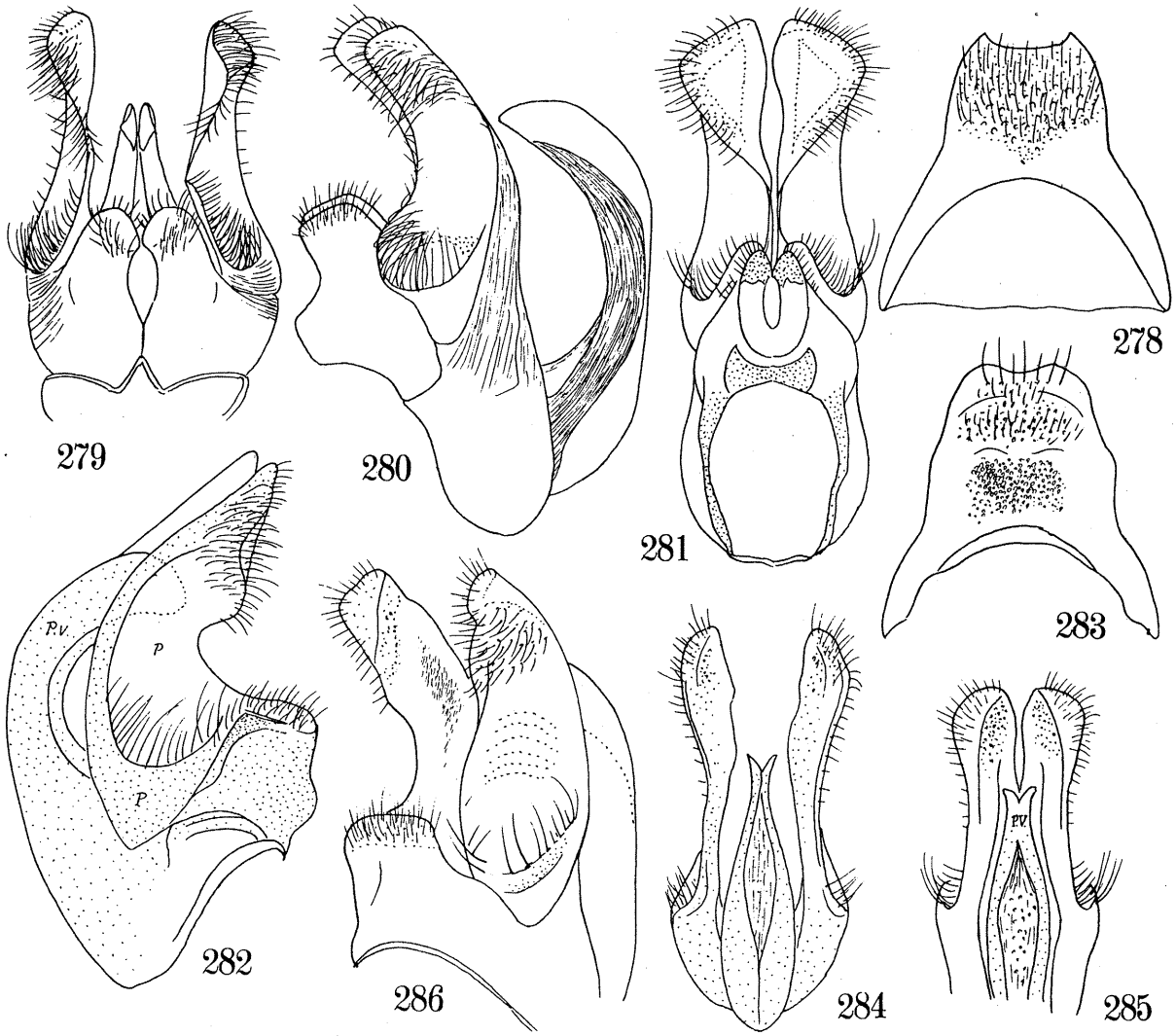
(5) Striae and punctures on sides of propodeum are also considerably variable in strength, density and size.

(6) Body length varies from 6.5 mm to 8.0mm, mostly 7.0 mm or so.

♂ (hitherto undescribed). 5.0-7.0 mm. Similar to ♀ in general, differs (besides the numbers of segments of antennae and gaster) in the following characters:

(1) The form of apical margin of clypeus (Fig. 277 - with labrum).

(2) Antennal joints relatively slightly shorter (but not so marked as in the usual



case - see measurements).

(3) Head relatively somewhat thicker, IODv relatively wider, but IODi relatively shorter, that is to say, eye incisions are shallower (see measurements).

(4) In OOD:POD OOD is much broader, that is to say, hind ocelli further apart from the eyes (see measurements).

Measurements: HW,HL,IODv,A3=100,56,25,15. HW,HL,IODi=100,86,70. IODv,IODi,IODc=10,28,17 (in ♀ =10,37,20). OOD,Od,POD,OCD=2,7.5,3.5,20 (measured at outer margin of ocellus). AOD,WAS,IAD=1,1,1. Al-13=11.5,10,9.5,8,7.5,7,6.5,6.5,6.5,6.5,6,5,8. A3=AW×2. Sternite 8: Fig. 278. Genitalia (from one of the Negros specimens) in ventral view: Fig. 279, in lateral view: Fig. 280. But when I examined the genitalia taken from a Samar specimen I found that the organs appeared markedly different: Figs. 281 (ventral), 282 (lateral). Sternite 8 also appeared somewhat different (Fig. 283). So I compared the genitalia of both the specimens in more detail. Seen vertically (to apical half) from dorsal side the organs of the Negros specimen: Fig. 284, while those of Samar: Fig. 285; seen in ventro-laterally the Negros: Fig. 286. It was presumed that both same in fundamental structural pattern and apparent difference is due mainly to the change by the condition at the time of preparation of the specimens and partly to the individual variation. The fact was confirmed by further examinations of the organs of about 15 specimens from various localities of the Luzon, Mindanao, Negros and Cebu. Most of them were close to those of the Negros specimen, but sometimes rather intermediate between the two instances and rarely similar to those of the Samar specimen.

As to sternite 8 possibly the same is also the case.

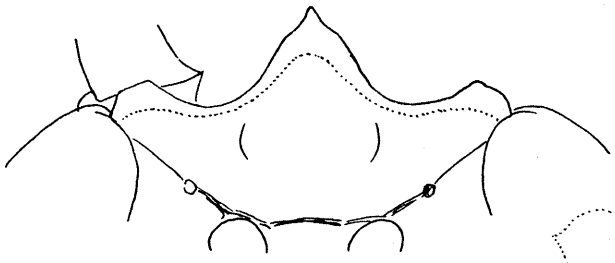
51. PISON (PISON) HOSPES SMITH, 1879

Pison hospes Smith, J. Linn. Soc. London, Zool., 14: 676, 1879 (♀ ♂, Hawaii).
Pison fuscipennis: Yasumatsu, Mushi, 9: 133, 1937 (♀ ♂, Palau, figs.); - Festschr. 60. Geburt. E. Strand, 5: 83, 1939.
Pison hospes: Krombein, Proc. Hawn. Ent. Soc., 13(3): 385 (key), 404, 19 ♀ ♂, Marshall Is., Caroline Is.); Ibid., 14(1): 139, 1950.
Pison hospes: Yasumatsu, J. Fac. Agr. Kyushu Univ., 10(2): 139, 1953.
Pison (Pison) hospes: Bohart & Menke, World Sphecid., p. 336, 1976 (listed, distrib.).
Pison hospes: Tsuneki, SPJHA, 19: 37, 1982 (3 ♀ 2 ♂, Bismarck Arch., figs. genitalia and sternite 8).

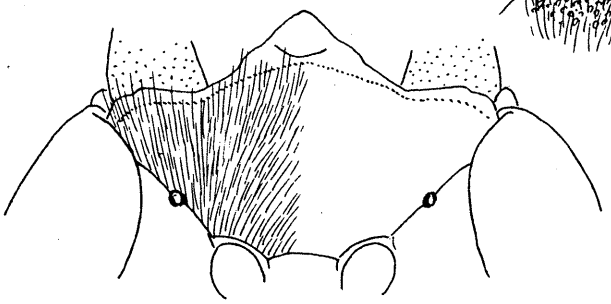
Specimens examined: 2 ♀ 3 ♂, Luzon: Prov. Laguma, Pagsanjan, 1-2.IV.1978, T. Tano(1♂), T.Murota(1♀3♂); 7-9.VIII.1978, T.Murota(1♀).
3 ♀ 6 ♂, Mindanao: Zamboanga, 1-2.VIII.1980, T.Murota(1♀2♂); Mt. Apo, 800-1000 m, 7-9.VIII.1980, T.Murota(1♀); Opol beach, Cagayan de Oro, 14.VIII.1980, C.Nozaka(1♀); Davao, 3-10.VIII.1980, T.Tano(1♂), C.Nozaka(2♂), T.Murota(1♂).
2 ♂, Cebu: Argao, 31.III.1979, T.Tano(1♂), C.Nozaka(1♂).
3 ♀ 5 ♂, Samar: Basey, 21.IV.1982, T.Tano.

This species may be a local race of Pison fuscipennis Smith, but the detailed characters of the latter species are unknown I followed here the view of Krombein (1949).
The characters of the Philippine specimens will be given in detail, especially on the structure of the male genital organs.

Redescription. ♂. 7.5-10.0 mm. Black, mandible on apical 2/3 reddish dark brown, palpi dark brown, apically somewhat paler, fore tibial spur and apices of other spurs, underside of tarsi and all claws brown, tarsal spines somewhat brownish; wings except basal area fairly strongly darkened, veins and stigma black. Hair silvery, pile on GT1-5 distinct. Seen from above HW,HL,IODv,A3=100,56,30,16. OOD,Od,POD,OCD=4,7,4,22 (if measured with pupils =4,4,4,22), Seen in front, with sides rounded, HW,HL,IODi=100,95, 72. IODv,IODi,IODc=10.25.15. AOD,WAS,IAD=5,4,5.5. A3,4,5,11,12,13=10,9,8.5,5.5,5,7. A3=AW×2.8. Ocelli in a triangle slightly higher than equilateral one, each similar in size, hind ones inclined postero-laterally, with margins finely impressed, interocellar area also inclined posteriorly, not crossed by transverse impressed line, posterior part behind hind ocelli only gently elevated, occipital margin gradually lowered at apices, not reaching buccal carina, fore ocellus in a broad shallow hollow, frons nearly flat, with fine weak medial furrow which is replaced on anterior half with a fine shining carina, reaching verge to anterior inclination, scapal hollow very marked. Clypeus: Fig. 287 (A and B, B with labrum). Collar of pronotum in frontal view with dorsal margin gently roundly raised, in dorsal view anterior blunt margin retreated posteriorly in middle and somewhat more acutely edged, admedian lines of mesoscutum short, finely raised, parapsidal sutures short, impressed, disc of scutellum broadly flat, postscutellum without medial notch; episternal furrow deep and distinct, scrobal furrow weak, but scrobe deep. Propodeum with weak lateral carinae, accompanied just inside with fine shallow furrow as a rule, but sometimes the carinae and furrows are completely lacking, area dorsalis not enclosed with carina nor furrow, but defined by the difference of hair direction - on area turned inwards, on outside turned outwards - sometimes bordered with weak furrow posteriorly, median furrow always distinct, with fine median carina at least at base, posterior inclination in lateral view oblique, as long as dorsal line (Fig. 288), surface in middle deeply furrowed above and broadly raised below, sides of the raised area longitudinally furrowed. Gaster with mlre or less constriction between G1 and 2, apical depression and transverse incrassation in front of the depression distinct not only on GTs but also GSs and subtuberculate transverse incrassation at mid lateral area fairly marked on both; further, GS2 at base with a narrow transverse platform, with posterior mar acutely edged and shortly produced in middle. Mid tibia with 5-6 and hind tibia with 8-10 short spines on outer side, in fore tibia they are weak, rather short hair like. in fore wing recurrent vein 2 always interstitial with apical transverse vein of cubital cell 2. Genitalia and sternite 8 from 10 specimens were examined. They are very constant in structure and form (except trivial extrinsic change) and no such variations are observed as in ashmeadi; sternite 8: Fig. 289 (ventral view, namely seen from outer side). Genitalia: Figs. 290 (ventral), 291 (lateral) and 292 (dorsal), basiparamere roundly excavated on ventral side as in the specimen from the Bismarck Archipelago (cf. SPJHA, 19: 38, figs. 67-69).
Frons finely, fairly closely punctured, PIS strongly microcoriaceous, almost mat,

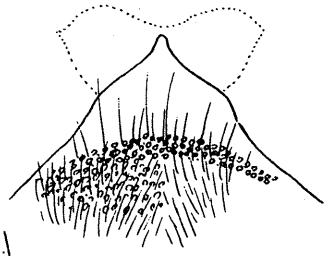


287 A ♂

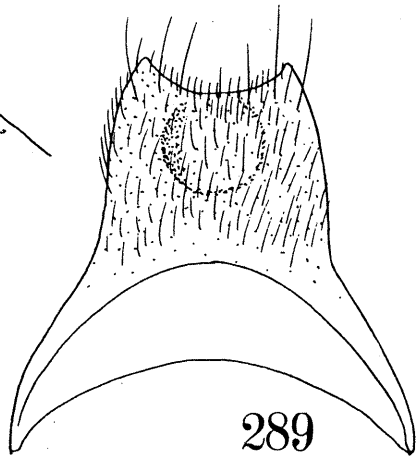


♀ 293

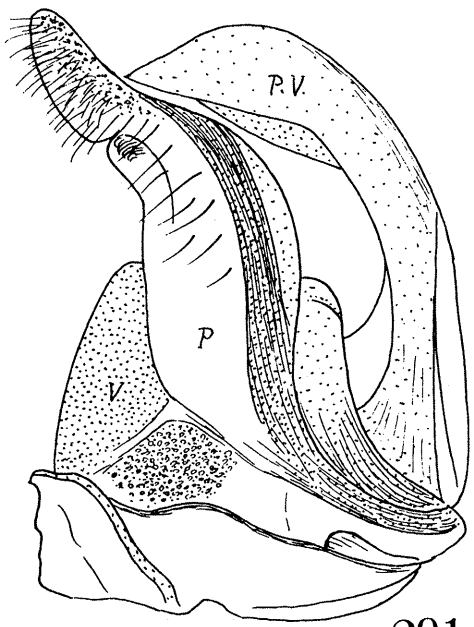
288



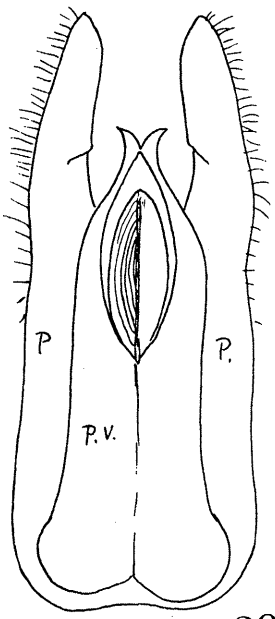
287 B



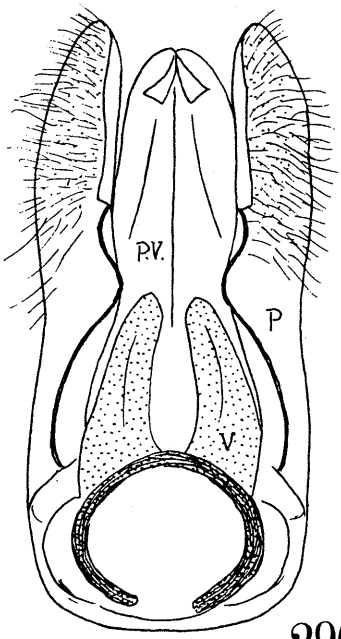
289



291



292



290

on vertex behind hind ocelli punctures slightly large, slightly sparser, with PIS more weakly microcoriaceous and surface fairly shining. Punctures on mesoscutum considerably large and close, PIS < PD and rather weakly microcoriaceous, on median area behind middle except marginal area punctures sparser, PIS > PD, on scutellum punctures somewhat smaller than on scutum and anteriorly sparse and posteriorly close, on postscutellum very fine and close, on mesopleuron similar on scutum in size, but closer, partly transversely contiguous, appearing transversely rugoso-punctulate; dorsum of propodeum strongly, fairly closely punctured, punctures obliquely arranged on lateral areas, appearing rugoso-punctate-striate, posterior aspect transversely so, on apical part striae stronger and coarser, with interspaces finely, irregularly rugulose, sides strongly and closely punctured, on anterior area obliquely rugoso-punctate-striate. GT1 finely, closely and uniformly

punctured with short-hair-bearing points, PID PD, the following tergites similarly punctured, but punctures gradually smaller and closer posteriorly, on GT1 PIS feebly microcoriaceous, but from GT2 posteriorly the microsculpture much feebler and indistinct, on GS2 punctured and microsculptured as on GT1, on GS3 and 4 punctures on broad central area slightly larger and sparser, but on lateral and posterior areas fine and close.

♀. 9.5–10.0 mm. Generally similar to ♂, somewhat differs in the measured values and in the apical form of clypeus (Fig. 293), anterior glabrous area not shining and mostly bevelled anteriorly (in Fig. 293 the area anterior to the arc).

HW,HL,IODv,A3=100,52,24,18. OOD,Od,POD,OCD=4,7,5,21. HW,HL,IODi=100,87,73. IODv, IODi,IODc=10,31,18. AOD,WAS,IAD=5,4,6. A3,4,5,10,11,12=10,9,8.5,5,5,7. A3=AW×3.

Remarks. Measured values are generally well agree with those of the specimens from the Bismarck Archipelago.

52. PISON (PISON) BAGUIONE SP. NOV.

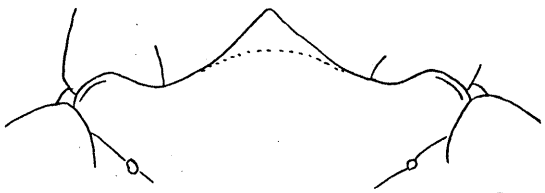
Main characters: Close and distinct punctures of mesothorax with PIS microcoriaceous, dorsum of propodeum punctured in the main, GS2 finely and sparsely punctured, GS3 simple, A3 > A4, OOD:POD=2:3, small body (♀ less than 10 mm), male genitalia and sternite 8 characteristic.

Somewhat similar in characters to the preceding species, but in the present species body is smaller, wings not so infuscated, clypeus different in form and dorsal aspect of propodeum is distinctly shorter than posterior aspec.

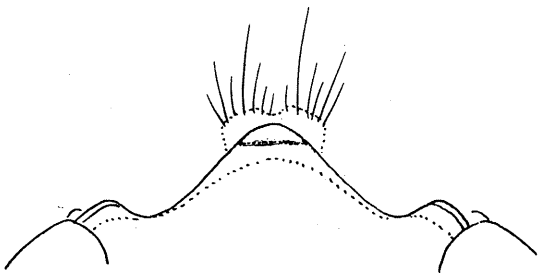
♂. 5.5–7.0 mm. Black; mandible apically slightly reddish brown, nearly black, palpi and tegula except inner area brown, tarsal spurs and tarsi largely (T2–4 or –5) somewhat brownish. Wings hyaline, veins slightly darkened. Hair silvery, pile bands on GT1–5 distinct.

HW,HL,IODv,A3=100,54,33,12. HW,HL,IODi=100,82,74. IODv,IODi,IODc=10,22,13. AOD, WAS,IAD=5,5,5. OOD,Od,POD,OCD=5,6.5,6.5,36. A3,4,5,11,12,13=10,8.5,7.5,5,4.5,7. A3= AW×2. A3 strongly widened apically, width at base and at apex =3.5:5.0 when length 10.

Hind ocelli slightly larger than the fore and inclined postero-laterally, with an impressed line at each posterior margin which is not connected with each other, interocellar area almost smoothly connected with posterior vertex; frons very gently roundly raised, almost flat, in front of fore ocellus broadly, roundly and shallowly depressed, median furrow broad and shallow, rather indistinct, without shining bottom line, but anteriorly till on inclination longitudinally carinated, carina shining. Clyeeus: Fig. 294

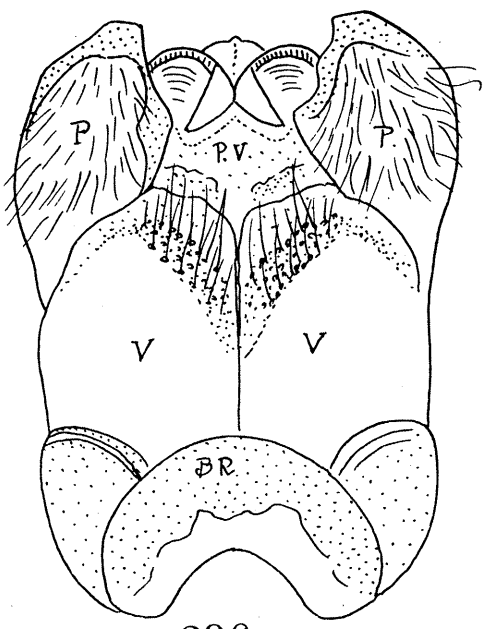


294

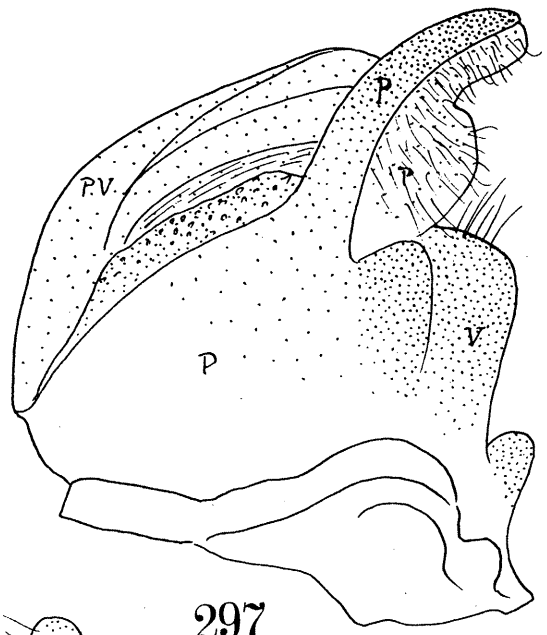


302

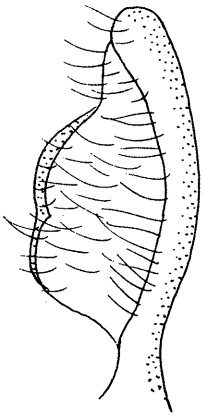
elevation on disc rather transverse, rounded, with top above middle, apical triangular glabrous area roundly swollen and smooth and polished. Collar of pronotum in frontal view gently roundly raised, very slightly tuberculate in middle, in dorsal view comparatively broad, bluntly ridged, on mesoscutum admedian lines short, shining low carinae, somewhat divergent posteriorly, notauli indistinct, parapsidal suture a shining, low, raised line, scutellum nearly flat, not impressed in middle, postscutellum also without median notch, mesopleuron with distinct pleural sulcus and a large scrobe, scrobal furrow only anteriorly distinct. Propodeum with or without lateral carinae, area dorsalis not enclosed with furrow, but with distinct median carina reaching apex, both sides of which comparatively broadly and fairly deeply impressed into medial furrow of the segment which is as a whole elongate circular in form, dorsum distinctly shorter than posterior aspect which is flatly truncate, more acutely inclined than usual, bearing a median excavation above, longitudinal bottom line of which distinct and shining, but medioposterior elevation very weak, usually rather indistinct. Gaster weakly constricted be-



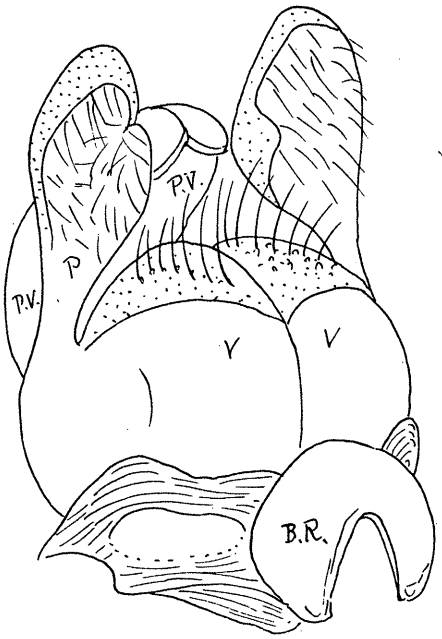
296



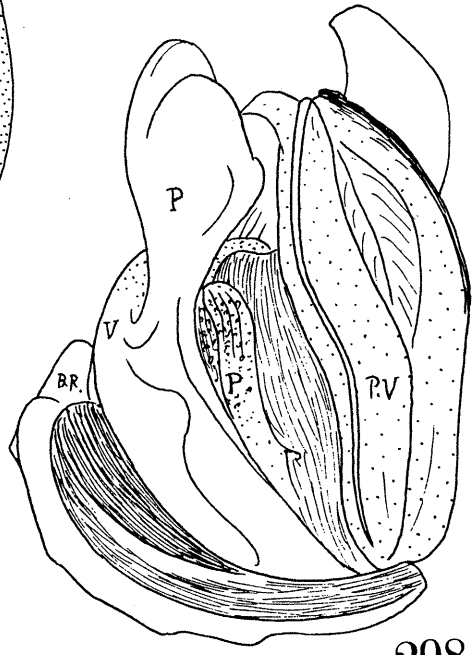
297



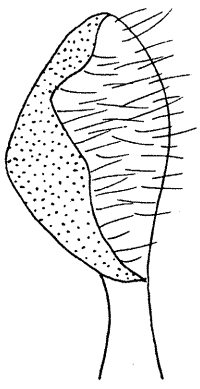
300



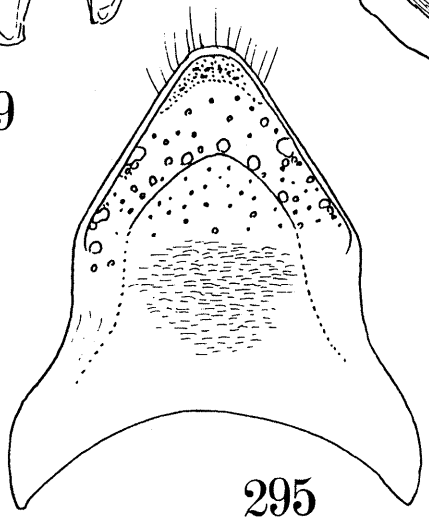
299



298



301



295

Figs. 295 - 301.
Pison (Pison) baguione sp. nov., ♂.

Genitalia and sternite 8.

tween G1 and 2, apical depression and incrassation in front of it of each tergite as usual, with mid lateral subtuberculate swelling not particularly strong, apical tergite (GT7) triangular, with apex minutely rounded and median line bluntly keeled as usual in ♀, in lateral view dorsal line cirved down and distinctly reflected at apex (at the apical half of the keeled area). GS2 with a narrow basal platform (usually covered with apical margin of GS1), mid lateral swelling weaker than on GT2, without median carina nor tubercle, GS3 also simple. Sternite 8: Fig. 295 (external view), apical half margined with shining carina and central area roundly raised, interspace between carina and elevation deeply depressed. Genitalia markedly robust: Fig. 296 (ventral), 297 (lateral) 298 (dorso-lateral) and 299 (ventro-lateral), apical half of paramere (area beyond basiparamere) at base narrow, apically markedly enlarged and deeply roundly hollowed on ventral side into spoon-shape, right-hand one seen from outer side: Fig. 300, seen from inner side: Fig. 301, ventral surface of enlarged area sparsely covered with hair. Volsella also very strange in form and hair.

Frons somewhat sparsely covered with fine, rounded, flat-bottomed punctures, with PIS 1-3 times PD and densely filled with very minute, indistinct microreticulation, with surface completely dull and opaque, on ocellar area and vertex behind this punctures slightly larger, not flat-bottomed and much closer, PIS less than PD and more distinctly microcoriaceous, but surface mat. Punctures on mesoscutum medium-sized, larger than on vertex, close, with PIS<PD and partly subcontiguous, PIS distinctly microcoriaceous, with surface fairly shining, on scutellum punctures similar in size, but much sparser, with PIS smooth and shining, mesopleuron punctured and microsculptured as on scutum, but on epimeral area punctures finer, closer and surface more opaque, metapleuron finely and closely punctured, PIS shining, without microreticulation; propodeum without microsculpture all over, PIS smooth and polished, median furrow on both sides of median carina transversely, shortly striate, on dorsum near median furrow simply, sparsely scattered with medium-sized punctures, but laterally (within the range of possible area dorsalis) obliquely rugoso-striate, with interspaces punctured, outside the area surface transversely, closely rugoso-striate and punctured, posterior inclination more coarsely, transversely rugoso-striate, with interspaces weakly punctured, sides obliquely, closely rugoso-striate and punctured, GT1 finely and closely punctured, PIS≦PD and weakly microcoriaceous, on the following GTs punctures posteriorly gradually finer and closer, with PIS feebly microcoriaceous, but on central area of GT2 punctures somewhat sparser, on GS2 at base and sides punctures very fine and close, but on broad central area punctures larger, much sparser, PIS shining (with very feeble microstriae), on medio-apical area broadly impunctate and shining, on GS3-5 punctures sparse and distinct, with microstriae on PIS, that are at base of each segment somewhat distinct, but feeble posteriorly.

♀. 6.5-7.5 mm. Similar to ♂ in general; tibial spurs black, only base of fore spur ferruginous, tarsal joints also black, only claws apically pale brown.

Clypeus: Fig. 302, elevation on the disc is more central, but with its top still slightly above middle; apical glabrous and smooth, shining triangular area is one-stepped, each step gently roundly swollen in sagittal section (dotted area in Fig. 302 roundly inclined anteriorly). HW,HL,IODv,A3=100,52,29,14. HW,HL,IODi=100,84,75. IODv,IODi, IODc=10,28,16. AOD,WAS,IAD=5,4,7. OOD,Od,POD,OCD=3,7,5,15. A3,4,5,11,12=10,8.5,7.5, 4,5,7. A3=AW×2.8.

Holotype: ♂, Luzon, Baguio, Mines View Park, 26.III.1978, C.Nozaka leg. (Coll. Tsuneki).

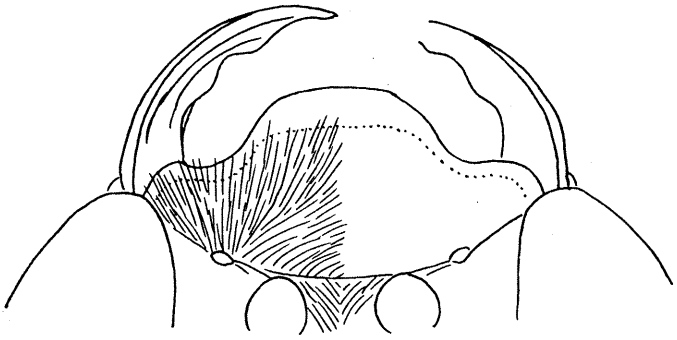
Paratypes: 1 ♀, same data as holotype, C. Nozaka; 13 ♀ 7 ♂, Prov. Launion, San Fernando, 26-27.III.1978, 26.XII.1979, T.Tano(8♀5♂), C.Nozaka(1♀), T.Murota(4♀2♂).

53. PISON (PISON) NOZAKAE SP. NOV.

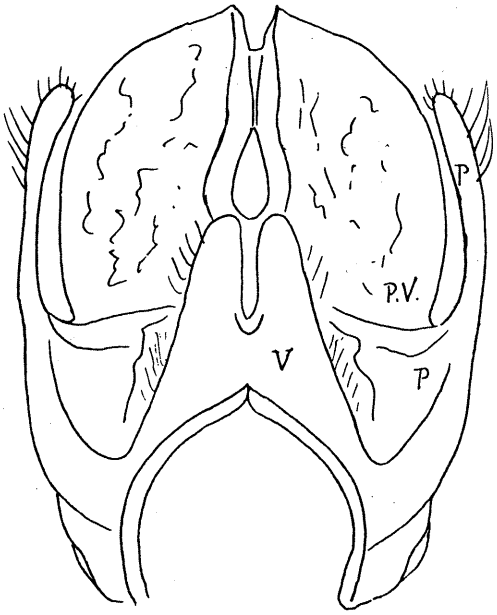
Closely allied to P. kohlii Bingham, characteristic structure of genitalia and 8th sternite also similar, but in the present species hair and pubescence are silvery, the apical margins of gastral tergites not ferruginous, apical margin of the clypeus in the male is completely different in form and PIS on mesopleuron without microsculpture.

♂. 9.5 mm. Black; apical third of mandible dark red, tegula largely translucent brown, palpi dark brown, apically paler, tibial spurs and claws ferruginous, wings considerably deeply infuscated with brown, veins and stigma black. Hair on clypeus silvery, strongly convergent towards medial line, pubescence on head and thorax greyish white, short, fine and soft, pile bands GT1-5 at apical sides distinct.

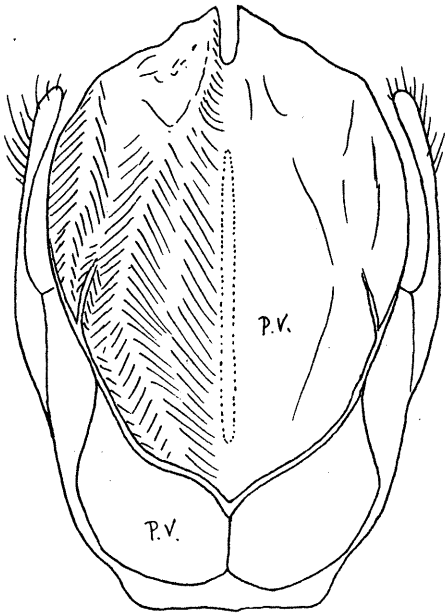
Seen from above HW,HL,IODv,A3=100,42,28,14, in frontal view HW,HL,IODi=100,90,70.



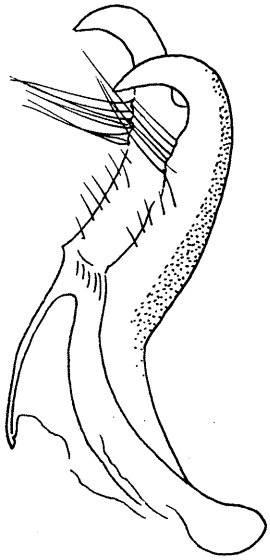
303



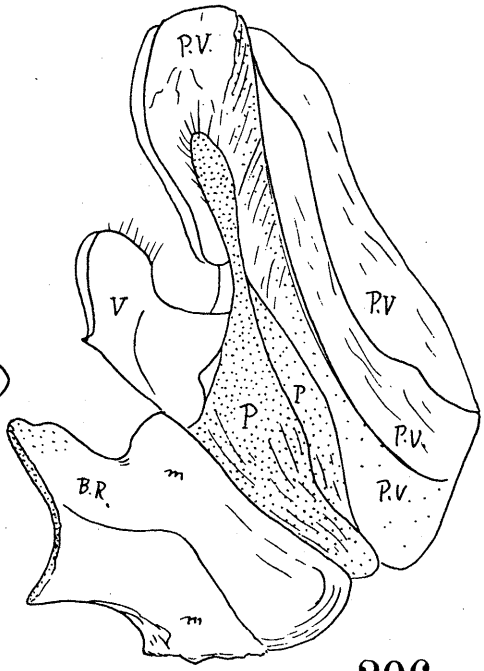
305



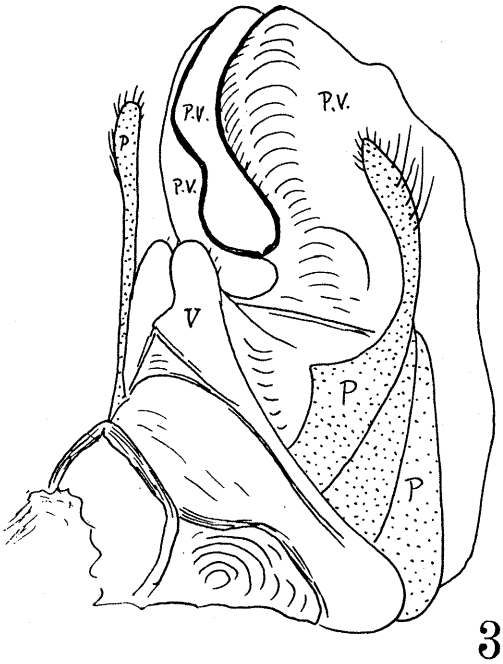
307



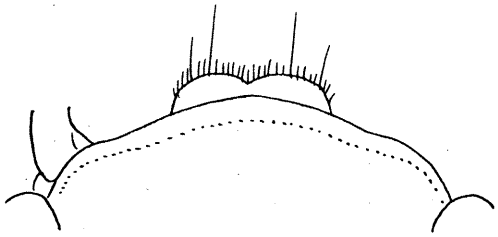
304



306



308



309

AOD,WAS,IAD=5,5,7. IODv,IODi,IODc=10,25,15. OOD,Od,POD,OCD=4,8,6,20. A3,4,5,11,12,13=10,6,5,4,4,7. A3=AW×2.5. Ocelli slightly higher than equilateral one, fore ocellus slightly smaller and inclined forwards, hind ones inclined postero-laterally and interocellar area smoothly inclined backwards, without fine impressed line along each hind ocellus, but the area behind ocellis broadly depressed into transverse furrow whence vertex raised to blunt interocular ridge, from the depression, from behind each hind ocellus a furrow runs to and along inner orbit, forming postero-lateral margins of the frons (the furrow is more acute at the verge than in kohli ♂, in both species the furrow is not marked in ♀). Frons gently roundly elevated, with apical inclination above antennae also gentle, more gentle than in kohlii which is also more gentle than usual, median furrow weak, indistinct, but a distinct pit is present at the centre (more distinct than in kohlii) whence a fine shining line runs down, which is soon raised into a carina, ending the obscure verge to anterior inclination. Clypeus: Fig. 303, disc highly, roundraised, with top slightly behind middle and from base till there medianly bluntly keeled. Mandible as in Fig. 303, very similar to that of kohlii (cf. Fig. 258). Dorsal margin of pronotum gently roundly raised in frontal view and weakly and broadly tuberculate in middle, on mesoscutum admedian raised lines short and parallel, parapsidal suture also a short raised line, scutellum gently convex, without medial depression, mesopleuron as in kohlii; propodeum short, with dorsum about 3/5 the length of posterior slope which is almost truncate, dorsum without lateral carinae, medial furrow also indistinct, but with a strong medial carina among the coarse longitudinal striae, medial furrow of posterior inclination distinct, fine, with shining bottom line which reaches close to apex. Gastral tergites 1–4 with apical depression and incrassation in front of it as usual, GT7 transversely broadly rounded, not keeled in middle, apical margin broadly straight as in kohlii, but at the lateral corners roundly produced (in kohlii not produced), GS2 with a narrow platform at base and without medial keel nor tubercle at the centre, basal depression also weak, GS2–4 weakly depressed at each apex and weakly raised in front of it as usual. GS8: Fig. 304 (ventro-lateral), very similar to that of kohlii, but here ventral side not swollen out in middle. Genitalia: Figs. 305 (ventral), 306 (lateral), 307 (dorsal) and 308 (ventro-lateral), the organs also very similar to those of kohlii. In fore wing recurrent vein 2 received by cubital cell 2 close to transverse cubital vein 2, apex of radial cell much retreated from the extention of the line connecting apices of discoidal cells and cubital cell 3 (just as in kohlii).

Frons very sparsely covered with very fine, rounded, shallow and flat-bottomed punctures, punctures are so fine and rather close to meshes of microreticulation that fills PIS that they can be defined only under high (70×) magnification, PIS 3–4 times PD, the microreticulation on PIS very strong and surface completely mat; on ocellar area and on vertex punctures slightly larger, deeper, closer and distinct, with PIS also microreticulate; punctures on mesoscutum moderately large and close, just as in kohlii ♂, PIS < PD and distinctly microcoriaceous, but with surface fairly shining, mesopleuron similarly closely punctured, punctures slightly larger than those on scutum, but here without microsculpture, well shining, on epimeral area punctures much smaller and close, on prepectus as on scutum in size, metapleuron very finely and closely punctulate, except the smooth marginal areas. Dorsum of propodeum longitudinally, strongly and very coarsely striate (as in kohlii), posterior aspect transversely, coarsely striate and sides finely and closely striate, striae on dorsal area longitudinal and anterior and ventral area oblique and arcuate and coarse, with interspaces of striae weakly punctured, this is also the case on posterior aspect. GT1 very finely punctured, on central area punctures somewhat sparse and on lateral areas close, PIS < PD, GT2 similar, except that punctures are somewhat finer, on GT3–5 punctures finer and closer, on GS2 distinctly larger than on GT1, somewhat sparse, PIS 2–3 times PD, but on lateral areas PIS=PD.

♀. 9.0 mm. Generally similar to ♂, but clypeus much less produced anteriorly (Fig. 309, with labrum), mandible normal, apical margins of GTs translucent brown, metapleuron almost impunctate, only with very feeble close punctules, seen from above HW,HL,IODv, A3=100,44,25,14. OOD,Od,POD,OCD=4,8,6,21. Seen in front HW,HL,IODi=100,88,70. IODV, IODi,IODc=10,30,17. AOD,WAS,IAD=5,4,6. A3,4,5,11,12=10,7,6.5,4.8. A3=AW×2.5.

Holotype: ♂, Mindanao, Davao, near beach, 5.VIII.1980, C.Nozaka (Coll. Tsuneki).
Paratype: 1 ♀, Mindanao, Zamboanga, 1-2.VIII.1980, T.Murota.

KEY TO THE SPECIES OF PISON IN THE PHILIPPINES

1 Eyes densely covered with short pubescence (two cubital cells in fore wing, apical margin of clypeus medianly gently rounded out, G1-2 markedly constricted, area dorsalis weakly margined with furrow, dorsum without lateral carinae, but with median carina, surface sparsely punctured, knees, fore tibia, tibial spurs and all T5 ferruginous), ♀ ♂, 5-6 mm
(Krombeiniellum) browni Turner, 1916

\- Eyes without short pubescence 2

2 Two cubital cells in fore wing (medio-apical margin of clypeus triangular, G1-2 not constricted, dorsum of propodeum with lateral carinae, area dorsalis without lateral furrow, but at base and in middle with a T-shaped shining carina, surface at base obliquely weakly striate, on the rest sparsely punctured, legs completely black), ♂, 5 mm (Pison?) murotai sp. nov.

\- Three cubital cells in fore wing, cell 2 always petiolated, small and triangular in form 3

3 Frons with large, close, subcontiguous punctures, thorax with large somewhat sparse punctures, puncture-interspaces smooth and shining, area dorsalis not enclosed with furrow, surface covered with strong coarse striae, ♀ ♂, 7-8 mm (Pison) punctifrons Shuckard, 1837

\- Punctures on frons and thorax not so large, on mesoscutum puncture-interspaces more or less dull 4

4 Dorsum of propodeum short, only about half the length of posterior slope which is concave-truncate (dorsum nearly longitudinally strongly and coarsely striate, punctures on mesoscutum moderately large, close, subcontiguous, with puncture-interspaces microcoriaceous) 5

\- Dorsum of propodeum not so short, at least 2/3 the length of posterior inclination 6

5 Hair golden (apical margins of gasteral tergites ferruginous, puncture-interspaces on mesopleuron microcoriaceous, apical margin of clypeus of ♂ medianly deeply incised), ♀ ♂, 7-9 mm (Pison) kohlii Bingham, 1897

\- Hair silvery (gaster black, puncture-interspaces of mesopleuron without microsculpture, shining, apical margin of clypeus of ♂ not incised in middle), ♀ ♂, 8-9 mm (Pison) nozakae sp. nov.

6 Recurrent vein 2 of fore wing received by cubital cell 2 at its mid point, hair on clypeus silky white, soft and so densely appressed that surface sculpture invisible (propodeal dorsum with lateral carinae, surface obliquely striate) 7

\- Recurrent vein 2 received by cubital cell 2 close to transverse cubital vein 2 or interstitial, hair on clypeus somewhat stiff, silvery, not so dense that surface sculpture well visible seen against light (dorsum of propodeum striate or punctate) 8

7 Oblique striae on propodeal dorsum strong and coarse, distinct over whole the length, medio-apical margin of clypeus in ♀ more or less depressed, eye incision comparatively broad and shallow, ♀ 6.5-8.0, ♂6.0-7.5 mm
(Pison) ignavum Turner, 1908

\- Oblique striae on propodeal dorsum weaker, finer, closer and partly indistinct, medio-apical margin of clypeus in ♀ not depressed, eye incision comparatively narrow and deep, ♀ 6.0-7.3, ♂ 4.5-7.3 mm
(Pison) argentatum Shuckard, 1837

8 Mesoscutum finely and closely punctured (dorsum of propodeum obliquely, finely and closely punctate striate at base, but on central area without striae, simply punctured), ♀ mostly 7 mm, 6 mostly 6 mm or so
(Pison) ashmeadi Turner, 1916

\- Punctures on mesoscutum considerably large, with puncture interspaces microreticulate 9

9 Wings fairly strongly darkened, gastral sternite 8 of ♂ with apex roundly emarginate (clypeus in ♀: Fig. 293, in ♂: Fig. 287, A3 in ♀ =AW×3, in ♂ =AW×2.7), ♀ 7.5-8.0, ♂ 6.5-7.5 mm (Pison) hospes Smith, 1879

\- Wings almost hyaline, gastral sternite 8 of ♂ with apex bluntly triangular (clypeus in ♀: Fig. 302, in ♂: Fig. 294, A3=AW×2.5 in ♀, =AW×2 in ♂), ♀ 6.0, 5 5.0 mm. (Pison) baguione sp. nov.

L I T E R A T U R E

Ashmead, W. H. 1904. A new genus and some new species of Hymenoptera from the Philippine Islands. Can. Entomol., 36(10): 281-285.

——— 1905. Additions to the recorded hymenopterous fauna of the Philippines, with descriptions of new species. Proc. U. S. Natn. Mus., 28: 957-971.

Baltazar, C. R. 1966. A catalogue of Philippine Hymenoptera (with a bibliography, 1958-1963). Pac. Ins. Monogr., 8: 326-336.

Bingham, C. T. 1897. Hymenoptera Vol. I. Wasps and Bees. In Fauna of British India, including Ceylon and Burma. London, 29 + 579 pp.

Bohart, R. M. and A. S. Menke. 1976. Sphecid Wasps of the World. A Generic Revision. Univ. Calif. Press, 695 pp.

Cameron, P. 1889. Hymenoptera Orientalia: or contribution to a knowledge of the Hymenoptera of the Oriental Zoological Region. Pt. I. Mem. Proc. Manchester Lit. Phil. Soc., Ser. 2: 91-152.

——— 1890. Idem. Pt. II. Ibid., Ser. 4, 3: 239-284 (Pl. 3).

——— 1900. Descriptions of new genera and species of aculeate Hymenoptera from the Oriental Zoological Region. Ann. Mag. Nat. Hist., Ser. 7, 5: 17-41.

——— 1902a. On the Hymenoptera collected by Mr. Robert Shelford at Sarawak and on the Hymenoptera of the Sarawak Museum. J. Str. Brit. R. Asiat. Soc., 37: 29-131.

——— 1902b. Descriptions of new species of fossorial Hymenoptera from the Khasia Hills, Assam. Ann. Mag. Nat. Hist., Ser. 7, 10: 54-69.

——— 1903. Descriptions of nineteen new species of Larridae, Odynerus and Apidae from Barrackpore. Trans. Ent. Soc. London, 1903: 117-132.

——— 1904. On some new species of Hymenoptera from northern India. Ann. Mag. Nat. Hist., Ser. 7, 13: 277-303.

——— 1904b. Descriptions of new genera and species of hymenoptera from India. Zeits. Syst. Hymen. Ditp., 4: 5-15.

——— 1905. A third contribution to the knowledge of the Hymenoptera of Sarawak. J. Str. Brit. R. Asiat. Soc., 44: 93-168.

Dalla Torre, C. G. 1897. Catalogus Hymenopterorum etc., Vol. 8. Fossores (Sphegidae). Lipsiae, 749 pp.

Giner Mari, J. 1945. Esfécidos Orientales (Himenópteros de la India inglessa cazados por el P. Ignacio Sala de Castellarnáu, S. J. 2e Serie: Esfécidos). Anal. Asoc. Española Progr. Cienc., 10: 847-857.

Iwata, K. 1933. New species of Pemphredon (Dinetus) and Tachysphex from Japan (Hymenoptera). Trans. Kansai Ent. Soc., 4: 45-60.

——— 1933b. A new species of Lyroda from Japan (Hymenoptera, Larridae). Ann. Zool. Jap., 14: 7-9.

Kohl, F. F. 1885. Die Gattungen und Arten der Larriden Autorum. I. Verh. zool. bot. Ges. Wien, 34: 171-267 (Pl. 8-9), Idem II. Ibid., 34: 327-454 (Pl. 11-12).

——— 1901. Ueber neue Arten der Hymenopteren-Gattung Tachysphex Kohl. Ibid., 51:777-784 (Pl. 7).

Menke, A. S. and R. M. Bohart. 1979. Sphecid Wasps of the World: Errors and Omissions (Hymenoptera: Sphecidae). Proc. Ent. Soc. Wash., 81(1): 111-124.

Krombein, K. V. 1949. The aculeate Hymenoptera of Micronesia. I. Scoliidae, Mutillidae, Pompilidae and Sphecidae. Proc. Hawn. Ent. Soc., 13(3): 367-410.

——— 1950. Idem. II. Appendix. Ibid., 14(1): 136-142.

——— 1981. The Smithsonian insect project in Sri Lanka, 1969-1975. Spolia Zeylanica, 35(1-2): 119-133 (Pl. 1).

Pulawski, W. J. 1962. Les Tachytes Panz. de la région palé arctique occidentale et centrale (Hym., Sphecidae). Polsk. Pism. Ent., 32: 311-475.

——— 1971. Les Tachysphec Kohl (Hym., Sphecidae) de la région paléarctique occidentale et centrale. Zaklad. Zool. Syst. Dosw. Polsk. Acad. Nauk., 1971, 1-461.

——— 1975. Synonymical notes on Larrinae and Astatinae (Hymenoptera: Sphecidae). J. Wash. Acad. Sci., 64(4): 308-323.

——— 1977. A synopsis of Tachysphex Kohl (Hym., Sphecidae) of Australia and Oceania. Polsk. Pism. Ent., 47: 203-332.

Ritsema, C. 1872. Description of a new genus and two new exotic species of the family Larridae. Ent. Mon. Mag., 9: 121-123.

Rohwer, S. A. 1919. Philippine Wasp Studies. Pt. I. Descriptions of Philippine wasps. Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser. 14: 5-18.

Saussure, H. de. 1867. Reise der österreichichen Fregatte Novara um die Erde etc. Bd. II. Hymenoptera, 1-138 (Pl. 1-4).

Smith, F. 1856. Catalogue of hymenopterous insects in the collection of the British

Museum. Pt. IV. Sphegidae, Larridae, and Crabronidae. London, 207-497. (Pl. 6-11).
Smith, F. 1958. Catalogue of hymenopterous insects collected at Sarawak, Borneo, Mt. Ophir, Malacca; and at Singapore by A. R. Wallace. J. Proc. Linn. Soc. London, Zool., 2: 42-130.
——— 1859. Catalogue of hymenopterous insects collected at Celebes by Mr. A. R. Wallace. Ibid., 3: 4-27.
——— 1873. Descriptions of aculeate Hymenoptera of Japan, collected by Mr. George Lewis at Nagasaki. Trans. Ent. Soc. London, 1873: 181-199.
Tsuneki, K. 1966. Contributoon to the knowledte of the Larrinae fauna of Formosa and the Ryukyus (Hymenoptera, Sphecidae). Etizenia (Occ. Publ. Biol. Lab. Fukui Univ.), 17: 1-15.
——— 1967. Studies on the Formosan Sphecidae (1). The subfamily Larrinae. Etizenia, 20: 1-60.
——— 1971. Idem. (11). A supplement to the subfamily Larrinae (Hymenoptera). Ibid., 55: 1-21.
——— 1973. Idem. (15). On some species collected by Mr. T. Murota in 1972, with descriptions of new species (Hym.). Life Study (Fukui), 17(3-4): 39-49.
——— 1974. A contribution to the knowledge of Sphecidae occurring in Southeast Asia (Hym.). Polsk. Pism. Ent., 44: 585-660.
——— 1963. Chrysididae and Sphecidae from Thailand (Hymenoptera). Etizenia, 4: 1-50.
——— 1976. Sphecoidea taken by the Noona Dan Expedition in the Philippine Islands (Insecta, Hymenoptera). Steenstrupia (Copenhagen), 4: 33-120.
——— 1982. Sphecidae collected by the Noona Dan Expedition to the Bismarck and Solomon Archipelagoes (Hymenoptera), SPJHA, 19: 1-58.
——— 1982b. Studies on the new material of Sphecidae, Chrysididae and Mutillidae of Formosa and the southern Ryukyus (Hymenoptera). Ibid., 23: 15-45.
Turner, R. E. 1915. Notes on fossorial Hymenoptera, 16. On the Thynnidae, Scoliidae, and Crabronidae of Tasmanis. Ann. Mag. Nat. Hist., Ser. 8,15: 537-559.
——— 1916. Notes on fossorial Hymenoptera, 20. On some Larrinae in the British Museum. Ibid., 8, 17:248-259.
——— 1916. Notes on the wasps of the genus Pison, and some allied genera. Proc. Zool. Soc. Lond., 42: 591-629.
Vecht, J. van der. 1937. On a new Piagetia, with notes on other species (Hym., Sphecidae). Ent. Med. Ned. Ind., 3(2): 21-26.
Williams, F. X. 1928. Studies in tropical wasps - their hosts and associates. III. The Larridae of the Philippine Islands. Bull. Exp. Sta. Hawn. S.P.A., Ent. Ser., 19: 61-111.
Yasumatsu, K. 1935. The genus Pison Spinola of the Japanese Empire (Hymenoptera, Trypoxylonidae). Ann. Zool. Jap., 15(3): 227-239.
——— 1939. Notes supplementaires sur le genre Pison Spinola du Japon (Hymenoptera, Trypoxylonidae). Festschr. 60 Geb. E. Strand, 5: 81-85.
——— 1941. Sphecoidea of Micronesia. 3. Family Larridae. Mushi, 14(1): 44-47.
——— 1953. Idem. 4. Revision of the genus Pison Spinola. Part 1.(Hymenoptera: (Sphecidae). J. Fac. Agr. Kyushu Univ., 10(2): 133-150.
* Tsuneki, K. 1968. Three species of Pison from the Marianas (Hymenoptera, Sphecidae). Kontyu, 36(1): 21-22.
* Swezey, O. H. 1942. Wasps of Guam. In Insects of Guam. 1. B.P. Bishop Mus. Bull., 172: 184-187.
Yoshimoto, C. M. 1960. Revision of Hawaiian Crabroninae, with synopsis of Hawaiian Sphecidae (Hym.). Pac. Ins., 2(3): 301-337.

A D D E N D A

I. REEXAMINATION OF THE TYPE SPECIMENS OF SOME OF THE WILLIAMS' SPECIES

Through the courtesy of Dr. Gordon M. Nishida, Department of Entomology, Bernice P. Bishop Museum, Honolulu, I could review the type specimens of the three species of Notogonidea and one species of Liris described by Willimas in 1928 that had some taxonomic problem. The results are as follows:

1. Notogonidea silvicola Williams, 1928

There is no problem regarding the female, but the type was reexamined in connection with the male and it will be redescribed in the following:

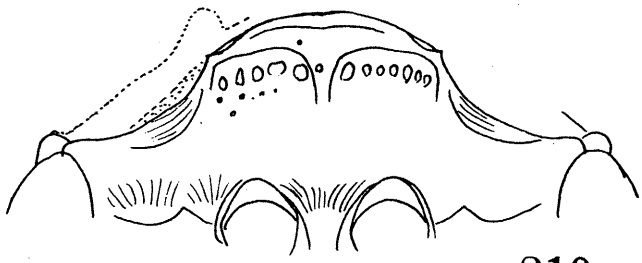
♀ (holotype). Length 13.5 mm, a pinned specimen, with 4 labels, from the top: (1) Los Banos Philippine Ids. Sept. 1917, in 3 lines, first 2 pressed and the date is handwritten, (2) F. X. Williams Collector pressed in 2 lines, (3) red type label: N. SILVICOLA (handwritten), HOLOTYPE (pressed), (4) name label: NOTOGONIDEA SILVICOLA F.X. Williams Det. F. X. Williams, handwritten in 4 ls. with ink, at a side 131 is added obliquely with pencil (Williams had a habit to write am of his name with small capital letters)

Generally well agrees with the original description, some comments:

Clypeus: Fig. 310, bevel distinct, shining, transversely weakly depressed across middle, medio-apical incision very feeble, almost lacking, Williams' figure is very correctly drawn, apical margin is thin and very weakly reflected, lateral angles of median advanced area (median lobe) each acutely angulated, slightly produced in a short tooth and the apical margin depressed just inside each lateral tooth (Fig. 310).

Measurements: HW,HL,IODv,A3=100,45,14,20. IODv,IODc,A3=10,34.5,15. A2,3,4,5= 5.3,10,9.5,9.5. A3=AW×2.7. Rhinaria on A7-11, small. (Well agrees with those of my specimens - cf. p. 27).

Sculpture on propodeum as in my large specimen, comparatively coarse (cf. p. 27).



310

Pygidial area. GT5 is partly broken to let GT6 completely obsevable, which becomes dirty on basal half with some glutinous substance, hairs and bristles are sticked together, brownish black, but on lateral areas short hairs are free and appear pale brassy, but in some light coppery, on apical half they are free, dark brown in colour, but in lateral view pale yellowish, half erected sparse bristles are upcurved, namely not reflected, with apices directed posteriorly and under oblique light appearing coppery.

Allotype ♂ which was presumed by me as distinct from the holotype female and named makiling was, however, not reexamined, because, according to Dr. Nishida it was not discovered among the Williams' type specimens preserved in the Bishop Museum. It was collected by C. F. Baker and the Baker's collection is said to be deposited now at the U. S. National Museum of Natural History. Thus the confirmation of the new status of this specimen was postponed until the next chance.

2. Notogonidea mindanaoensis Williams, 1928

Holotype ♂. About 8.3 mm, pinned with No. 1 insect needle of 38 mm in length; complete specimen, with fore legs folded under the thorax, its genitalia are taken out and embeded in balsum in a punched hole of card paper supported with 2 sheets of round coverglass - the organs are heavily discoloured and except densely pigmented area, such as outer parts of volsella, turned into transparent yellow (the same as balsum) and it is difficult to clarify the details in structure - . Four labels are attached, from the top: (1) Lake Lanao Mindanao V.I. XI-3-1921, handwritten in 3 lines with black ink, (2) F. X. Williams Collector, pressed in 2 lines, (3) red type label, N. MINDANAOENSIS (handwritten) Holotype (pressed) in 2 lines, (4) NOTOGONIDEA MINDANAOENSIS ♂ LAKE LA-

NAO 16,126, 1921 handwritten in 4 lines with black ink.

Paratype ♂. Pinned specimen, parts of head and thorax are stained with liquid paste, genitalia are detached and made into a slide, but in this specimen the organs are not embeded into the balsum, but glued on to the upper one of the two cover-glasses covering the punched hole of card paper, so that the organs are not discoloured as done in the holotype specimen; otherwise a complete specimen. Four labels, from the top: (1) Lake Lanao Mindanao, ?? (sign) XI-3-1921, handwritten in 3 lines with black ink, (2) F. X. Williams Collector, pressed in 2 lines, (3) yellow type label, 3×14 mm, "Paratype" pressed, (4) name label, Notogonidea Mindanaoensis ♂ ?? m 2 ?? 407 F.X.W., handwritten in 3 lines with black ink.

Holotype: Well agrees with the original description, but the vestiture is rather white or silvery, only with a faint tint of brassy; U-shaped pile band on mesoscutum not marked, in oblique light only observed, pile bands on GT1-3 silky white and dense short hair covering GT4-7 brown in colour, not soft. Measurements (within parenthesis paratype): HW,HL,IODv,A3=100,47,21,9,15 (=100,46,18,8,16), IODv is distinctly broader in holotype than in paratype. IODv,IODc,A3=10,25,7.3 (=10,28,8.3). A2,3,4,5,11,12,13=6.5, 10,11,11,9,8,11 (=6,10,10,10.5,8.5,7.5,10). A3=AW×1.8 (=AW×1.7, both dorsal view). AOD, WAS,IAD=11,6,4 (ditto). Abscissae of radial vein of fore wing are in the following length increasing order: 2,5,3,1,4, relative length = 2,3,4.5,9,14. Inner orbits on lower part parallel to each other, clypeus with median lobe broadly and markedly more highly elevated than in 4 specimens before me (in this respect paratype is similar as in my present specimens). Propodeal dorsum with lateral carinae, not strong but thorough and zigzagged, surface somewhat coarsely reticulate, with longitudinal rugulae strong and more marked, but in some light transversely, somewhat obliquely, moderately closely rugoso-striate, these transverse rugosed striae become sparse (about 4) and strong on lateral areas to turn into distinct carinae. Punctures on mesoscutum somewhat larger than docilis-subtessellatus ♂, close, without lineal arrangement, mesopleuron rather strongly and coarsely rugoso-reticulate, but the sculpture posteriorly finer and weaker, scrobal furrow completely disturbed with rugulae and except scrobe almost invisible, episternal sulcus strong, deep and foveolate. Fore femur compressed dorso-ventrally, but lower face in posterior view not flattened, closely covered with long silvery pubescence, mid femur with ventral margin also fringed with long silvery pubescence, while hind femur glabrous and excavated beneath with ventral margin gently upcurved. Fore tibia without spine on anterior face, hind tibia acutely bicarinate on outer face, carinae fairly acute but not finned, posterior one with only a single spine (except apical one) at 1/5 from apex. Antennal placoids on A4-13, on 13 ending near apex, surface not smooth, but microgranulate, dull and opaque. Genitalia in the slide are strongly discoloured and detailed structure of volsella etc is not clear, but judging from nearly transparent volsellar ventral plate it seems that general structure is as in my silvicola ♂ that is newly combined with its ♀ (cf. p. 28, Figs. 49 and 50). Wings on radial cell and apical margin broadly infuscate.

Paratype: Similar in characters to holotype ♂, but the medial lobe of clypeus is not so strongly elevated as in this, measurements generally similar, except IODv, as given with those of holotype within parentheses. Genitalia are quite identical in structure with those of my newly combined males of Liris (Leptolarra) silvicola ♀ (cf. p. 28, Figs. 49-51).

Allotype ♀. It was most desired to observe the allotype female of Notogonidea mindanaoensis Williams, but the specimen is not preserved in the collection of Bishop Museum and I can not reexamine it to confirm its true status. Dr. Nishida communicates me that possibly it is in the collection of U. S. National Museum since it was collected by C. F. Baker at Sandakan, N. Borneo.

According to the original description this allotype female is practically identical with silvicola ♀, except the colour of vestiture including pile bands on gaster that are light golden, while one of my new silvicola males that was captured in Mindanao has the vestiture distinctly brassy, as against the silvery in other specimens from Luzon, showing that the colour of the vestiture is not important in this group to separate the species.

3. Notogonidea robustoides Williams, 1928

Holotype ♀. Glued on to elongate triangulae card point with its ventral side, left antenna is dropped off and glued on to vertex, otherwise complete. Four labels, from the top: (1) 9×3.5 mm, Los Banos Philippine Ids. pressed in 2 lines, (2) Coll.

F. Muir (pressed) VII. 16 (handwritten) in 2 lines, (3) red type label: N. ROBUSTOIDES (handwritten) HOLOTYPE (pressed) in 2 lines, (4) black-edged name label: NOTOGONIDEA ROBUSTOIDES F. X. Williams Det. F.X.Williams all handwritten in 4 lines with black ink.

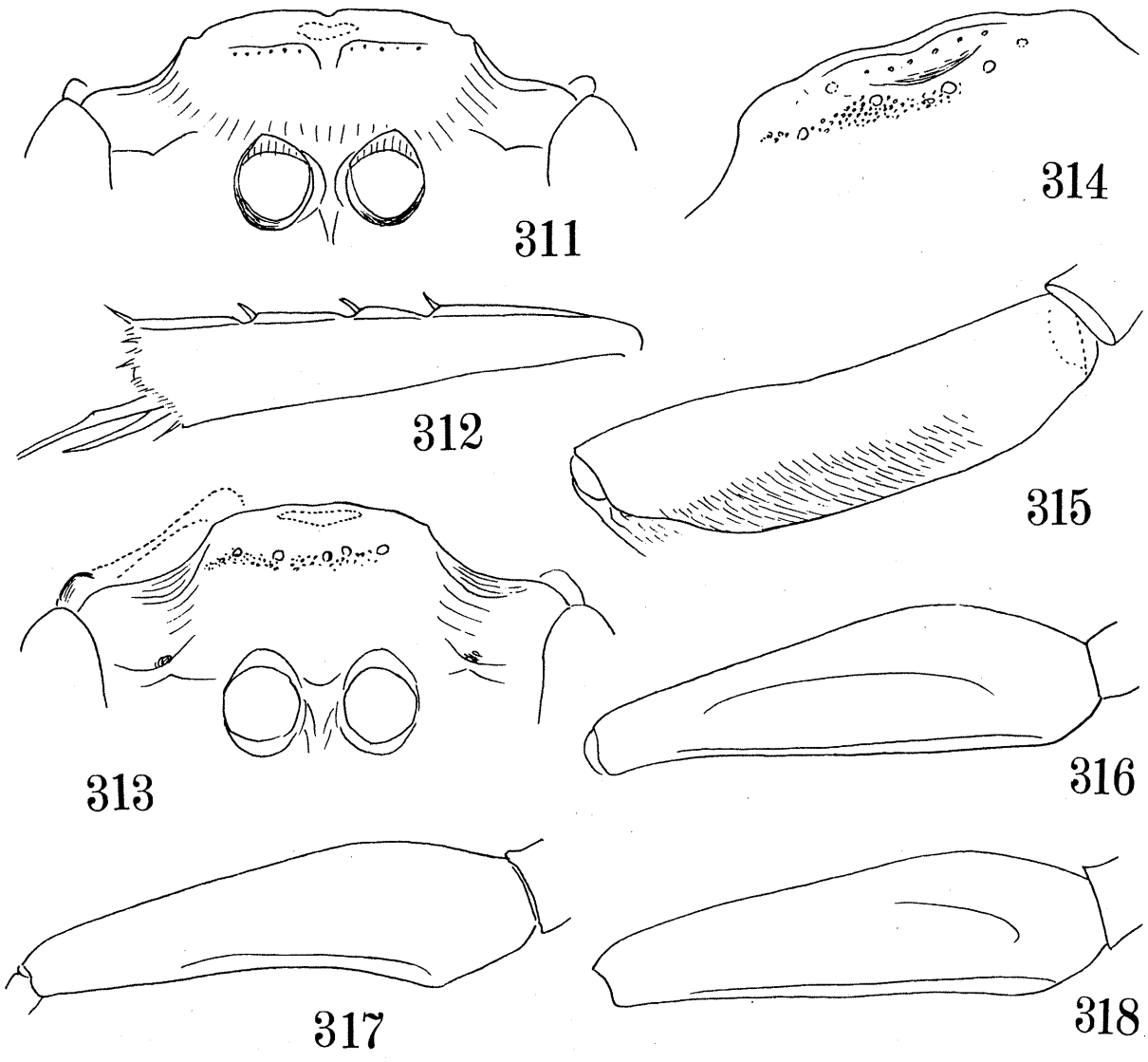
Length 9.3 mm, wing veins strongly yellowish, possibly faded, hair on frons and clypeus silvery, pile bands on gaster on GT1-3 present, mesoscutal U-shaped pile mark is in some direction distinct as usual, silvery. Measurements: HW,HL,IODv,A3=100,48,19,17. IODv,IODc,A3=10,28,9. A2,3,4,5=7,10,11,11. A3=AW×2.3 (lateral) or AW×2.4 (dorsal). CML: CLL=20:8.5. AOD,WAS,IAD=9,5,2. Abscissae of radial vein of fore wing in the following increasing order: 5,2,3,1,4, their relative length =3,5,5.5,10.5,15. Antennal rhinaria comparatively large, elongate elliptic in form, on A6-12 present, even on A6 only slightly shorter than half the length of the segment, on A10-11 in full length, on A7-9 leaving a narrow space at base and apex. Clypeus: Fig. 311, bevel distinct, bearing a short, transverse depression in middle and scattered irregularly and sparsely with fine, not well outlined punctures, no large puncture line behind bevel, disc medianly bluntly raised and this area alone microcoriaceous; mesoscutum depressed medio-anteriorly, notauli distinct and comparatively long, mesoscutum and mesopleuron finely and closely punctured, punctures on scutum in some direction appearing transversely linearly arranged and on episternum appearing longitudinally arcuately arranged, scrobal furrow anteriorly distinct, foveolate, posteriorly not foveolate, shallow, weak, not reaching posterior margin, scrobe itself appear like one of the foveae. Propodeal dorsum with median and lateral carinae, median carina distinct, long, reaching close to posterior margin, surface transversely, fairly closely rugoso-striate, striae-interspaces rugulose, not shining, rugae laterally (behind spiracles) sparser and stronger, lateral carinae appearing at a short distance from spiracles, running posteriorly till apex of posterior aspect, fairly strong and distinct, not zig-zagged (partly due to small number of transverse carinae), posterior aspect with an up-curved carina at dorsal margin on each side of medial, somewhat depressed, triangular area, the carinae convergently curved down along the sides of this area, but soon absorbed in upward divergent branches of medial furrow, posterior aspect except uppermost curved carinae without transverse carinae, surface (partly rugulose) closely covered with fine, weak, piliferous punctures and at medio-posterior area provided with 6 longitudinal carinae, of which 2 outer pair long and the inner pair short, the latter forms the lateral ridges of the finely extended medial furrow and the former somewhat divergently extended upwards; sides transversely, somewhat obliquely and arcuately, finely, fairly closely striate, striae on central broad area almost obsolete. Pygidium at base with a triangularly produced, wedge-shaped glabrous, smooth and shining area. Hind tibia with outer carina finned, including 4 short, thick spines as given in Fig. 312.

Allotype ♂. Pinned specimen, from which right antenna, right fore T4-5 and right hind tibia and tarsus are lost. Gaster is detached and glued on to a card paper, 20×17 mm, from which genitalia and 8th sternite are taken out and made into a microscopic slide in a punched hole of the paper, on this paper are handwritten by Williams: NOTOGONIDEA ROBUSTOIDES F.X.WILLIAMS Los Banos P.I. Det. F.X.Williams, in 5 lines and at a side is added 600 with pencil. At the upper margin is glued a small slit of red paper on which is pressed: Allotype (two first letters of pressed Holotype are corrected with black ink to Al). To the pinned main body are attached 4 labels, from the top: (1) Los Banos Philippine Ids (pressed in 2 lines), VIII. 16 (handwritten), (2) F.X.Williams Collector (pressed in 2 lines), (3) red type label: N. ROBUSTOIDES (handwritten) ALLOTYPE (corrected from HOLOTYPE as given above), (4) name label: NOTOGONIDEA ROBUSTOIDES F.X.W. det. F. X.W. all handwritten in 4 lines with black ink and added "600" and "129" with pencil on the side.

As I presumed that it was some form of Liris (Leptolarra) subtessellatus or docilis the characteristic parts of the latter species are particularly carefully observed:

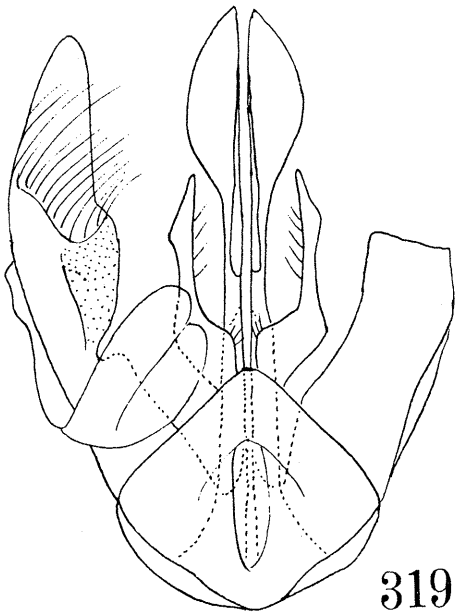
Clypeus: Fig. 313, median lobe with a weak bevel-like inclination (surface feebly microcoriaceous), carrying a transverse gentle depression in middle and with spical margin medianly slightly emarginate, but without a lateral incision just inside each lateral angle and extreme apical margin slightly incrassate, seen obliquely from above and left side: Fig. 314. This is distinctly different from those of subtessellatus or docilis in which lateral corners of medio-apical margin are much more acutely angulate (though from of apical margin is considerably variable) and surface without microsculpture and shining (sometimes without puncture, sometimes sparsely or transversely lineally punctured). Legs black, hind femur without reddish tinge; fore femur in posterior view: Fig. 315, with lower margin less flattened than in subtessellatus, moreover, much thicker as a whole, length to maximum width = 40:10.5 (in subtessellatus usually 40:9.0).

Hind femur in posterior view (Fig. 316) is also much less angulated near base beneath than in the usual form of subtessellatus (Fig. 317), but in the latter sometimes near to the specimen (Fig. 318). Sculpture on propodeal dorsum generally similar to the very coarse instance in subtessellatus, but the transverse rugosed striae are closer than in ♀, especially marked at the lateral areas (this is reverse to the usual case between sexes of the same species), median carina not reaching middle, thence posteriorly surface deeply excavated into furrow, but the furrow not reaching apex, lateral carinae from about middle running till apex of posterior aspect, generally stronger than in subtesselatus, but much more markedly zigzagged than in ♀, this is partly due to that the transverse rugae of the dorsum are much closer than in ♀, sculpture on propodeal sides also generally similar to the strong and coarse case in subtessellatus, namely broadly, obliquely striate, striae strong and coarse on antero-ventral area and very feeble and indistinct on dorsal and posterior portions, on the broad central area weak and partly obsolete. The sculpture on posterior aspect is markedly different from that of ♀, namely, at medio-posterior area there are only a pair of longitudinal short carinae, one at each side if medial surrow, the series of 3 pair carinae that is present in ♀ is not observed, moreover, the surface transversely, coarsely rugoso-striate, not closely covered with piliferous punctures as in ♀. This is very important to determine the sex combination. The state of contact of pro- and mesonotums and punctation of the latter as in the compared species or in ♀, but the medio-anterior depression longer, turned to furrow, notauli similarly long. Measurements: Length (head and thorax-complex + detached gaster) about 9 mm as given by Williams. HW,IODv,A3=100,21,14. IODv,IODc,A3=10,25,7.

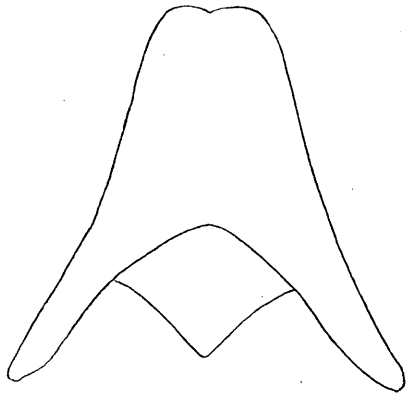


Figs. 311-312: N. robustoides ♀, 313-317 so-called its ♂, 317-318: subtessellatus ♂.

CML:CLL=20:14.5. AOD:WAS:IAD=9:5:3. A2,3,4,5,6,11,12,13=7,10,9,10,10,8,8,11. A3=AW×2. placoids on A4-13, on A13 reaching 2/3 from base. Increasing length order of abscissae of radial vein of fore wing: left 5=2,3,1,4, relative length =3,3.5,6,9,15; right 5,2,3, 1,4, relative length =3,4,5.3,9,15. GT7 of gaster partly broken and genitalia and 8th sternite are taken away, but pygidium on GT7 is observed which is flattened, laterally bluntly carinated, with apical margin broadly, triangularly incised. Pile bands on gaster are on GT1-3. Genitalia and sternite 8 in the microscopic slide are almost completely discoloured and very difficult to observe. The sketches: Figs. 319 and 320. These are distinctly different from those of subtessellatus.



319



320

Figs. 319 and 320.
Liris (Leptolarra) banosensis sp. nov.
Genitalia and 8th sternite in male.

Remarks. Direct comparison of the allotype male specimen of Notogonidea robustoides Williams with the various forms of Liris (Leptolarra) subtessellatus (Smith), ♂ that was presumed to be identical with the former made it clear that it was a species distinctly different from subtessellatus. At the same time, however, it showed that the latter is closely similar to the former and has a fair probability to be misidentified with the former. Williams' comment "males from Singapore and Borneo have the hind femora red and well emarginate along their posterior border near the base" seems to show clearly his misidentification of subtessellatus with his robustoides ♂.

On the other hand, it was questioned that N. robustoides ♂ might be identical with Liris (Leptolarra) hanedai Tsuneki, occurring in Formosa. But the direct comparison also denied this presumation. In hanedai ♂ IODv÷A3+4, A3=AW×1.5, propodeal dorsum without lateral carinae, sculpture of its posterior aspect different and apical part of the genitalial paramere much narrower.

As thus presumed probable identity regarding two species has disappeared a possibility has arisen that it may be a true male of robustoides ♀. To combine them together, however, it is a serious hindrance that the sculpture on the propodeal dorsum and posterior aspect is different in the fundamental pattern. While in the male specimens that are newly combined with robustoides ♀ there is no obstacle to do so in the sculpture concerned, as well as in other non-sexual characters. I, therefore, separate the described male of robustoides from its holotype female and deal with it as a distinct species:

Liris (Leptolarra) banoensis sp. nov.

Holotype: ♂, the so-called allotype of Notogonidea robustoides Williams, 1928 (as to detailed data of the specimen see above).

♀, unknown.

Among the 9 male specimens designated by Williams as paratypes of robustoides it seems certain that some of subtessellatus or docilis are included through misidentification and so they are all excluded here from the category of the present species.

4. Liris mindanaoensis Williams, 1928

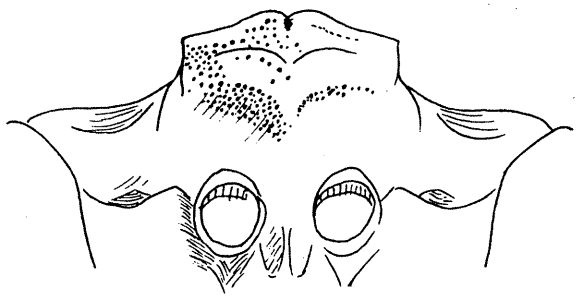
The allotype male of this species could be reexamined quite unexpectedly. because it was sent erroneously with Notogonidea mindanaoensis (now Liris (Leptolarra) mindanao — Liris (Leptolarra) silvicola). As it had an exceptionally well developed pygidial area (Fig. 224) I begged to see the holotype female also and the complete reexamination of this species realized. There is no taxonomic problem in regard to this species, but the result of the observations are recorded here.

Allotype ♂. Present status: Pinned with 38 mm steel black needle of No. 3 in thickness. Right fore tarsus from T3 apically lost, right antenna dropped off and glued on to vertex, gastral end open and genitalia taken away, otherwise complete. Four labels, from the top: (1) Zamboanga Mindanao ♀ J.10-12-1921, handwritten in 3 lines with black ink, (2) F. X. Williams Collector, pressed in 2 lines, (3) red type label, 11×3 mm, L. MINDANAOENSIS (handwritten) Allotype (pressed) in 2 lines, (4) name label, Liris MINDANAOENSIS F.X.Williams Det. F.X.Williams handwritten in 4 lines and added 41 ♂ at a corner (18×9 mm black edged label).

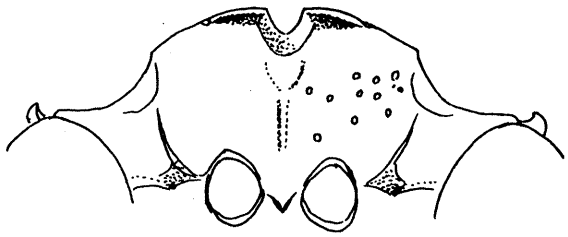
Length 11.5 mm. Comparatively slender insect, having the maximum width of head, thorax and gaster 3.1, 2.5 and 2.1 mm respectively. Black, mandible on apical 2/3, tegula, fore tibial spur and spines of legs ferruginous, tarsi apically brownish, mid and hind tibial spurs black. Hair on lower frons and clypeus brassy, pile on thorax and propodeum also pale brassy, comparatively long, U-shaped hair band on mesoscutum in some light distinct, appressed hair on pygidium fairly long, rather soft, pale brownish in colour and not mixed with half erected bristles. Wings apically distinctly clouded.

Measurements: HW,HL,IODv,A3=100,48,22,16. IODv,IODc,A3=10,22.5,7.5. AOD,WAS, IAD=8.5,5,4. A2,3,4,5,11,12,13=6,10,10,10,8,8,9 (in the well extended right antenna, glued on vertex =6,10,11,11,8,8,9.). A3=AW×2.5, =BW×3.0, from apical third markedly incrassate apically, rhinaria on A5-11 beneath, elongate oval, basally pointed, on A5 about 3/7 the length of the joint, with empty space of 1/7 at apex and 3/7 at base, on 7 longest, slightly more than half joint length, thence apically gradually shorter and narrower, on 10 similar, but joint itself shorter than 7, on 12 and 13 lacking. Abscissae of radial vein with length increasing order and their relative length different between right and left: in the right 5,3=2,1,4 and 5,7,7,12,23 in the left 5=3,2,1,4 and 5,5,8,14 and 23. Inner orbits roundly (outcurved) convergent below, but nowhere parallel. Clypeus: Fig. 221, mandible with a weak notch before middle (Fig. 322, outer view) and with a single large triangular tooth on inner margin which is acutely pointed at apex (Fig. 323). Scapal furrow at outside antennal socket narrow and very deep, running divergently upwards shallowing. Head seen from above with postocular area till occipital margin about half IODv. Mesoscutum medio-anteriorly fairly deeply and broadly furrowed, scutellum and postscutellum without medial impression, on mesopleuron episternal furrow distinct, foveate, but foveae not reaching anterior margin of the furrow, scrobal furrow anteriorly distinct and foveolate, but posteriorly behind scrobe weak, not foveolate, but reaching metapleuron. Propodeum without lateral carinae, except posterior part of posterior aspect, in lateral view both aspects forming an angle of about 120 and at the top angle roundly produced, dorsum with feeble median carina, not reaching apex, medioapical area broadly flattened, slightly depressed; posterior aspect medianly broadly excavated and in middle deeply furrowed. GT7 (cleaned with alcohol) with surface flattened till base and very long like usual female (Fig. 324), but its lateral carinae not reaching till base, but much longrr than usual, surface rather sparsely covered with comparatively long soft hair, pale brownish in colour, ground surface visible, consisted of elongate medium-sized punctures, longitudinally, subrugosely and subcontiguously arranged whence hair arisen, but not included stiff erect hair, PIS narrow and shining and at central area provided with a short blunt glittering carina (Fig. 324). Fore femur medianly broadly (but less than half the length of the femur) flattened beneath, but without basal angle (as seen in docilis), closely covered with long, mainly appressed and partly erected silky white pubescence, fore tibia without spine on anterior surface, hind femur not excavated beneath.

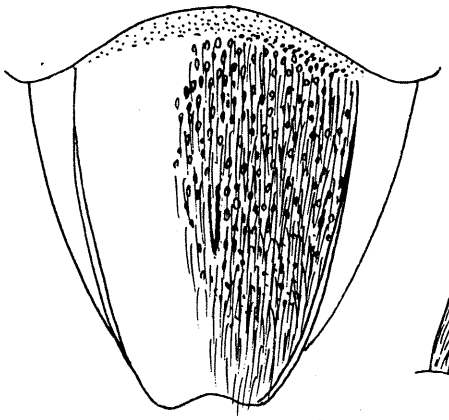
Mesoscutum finely and closely punctured, but without linearly arranged appearance, on mesopleuron epimeral area covered with pale brassy pubescence and surface invisible, below scrobal furrow posteriorly finely and smoothly microcoriaceous and sparsely scattered with fine punctures, medianly and anteriorly somewhat coarsely, strongly and subrugosely microgranulate and also scattered with fine punctures (under 60× mag.). Propodeal dorsum minutely, irregularly (but size uniform) rugoso-reticulate, on median area rugae appearing in some light transversely arranged, on lateral areas sparse transverse striae distinct, but not very strong, posterior aspect somewhat coarsely microcoriaceous and in some light appearing transversely, sparsely and not strongly striate, sides of



321

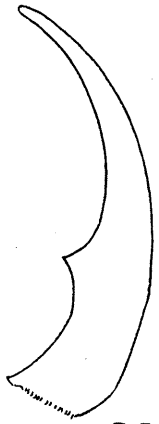


325

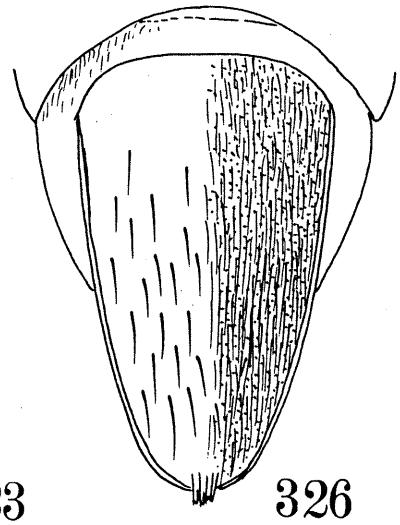


324

322



323



326

propodeum obliquely distinctly striate except dorsal area, with interspaces somewhat coarsely microgranulate.

Holotype ♀. Pinned specimen with detached left antenna glued on to left eye, with 4 labels, from the top: (1) Zamboanga Mindanao, 10-12-1921 handwritten in 3 lines, (2) F.X.Williams Collector, pressed in 2 lines, (3) L.MINDANAOENSIS HOLOTYPE handwritten and pressed in 2 lines, (4) Liris MinDANAOENSIS Det F.X.Williams, handwritten in 4 lines with black ink.

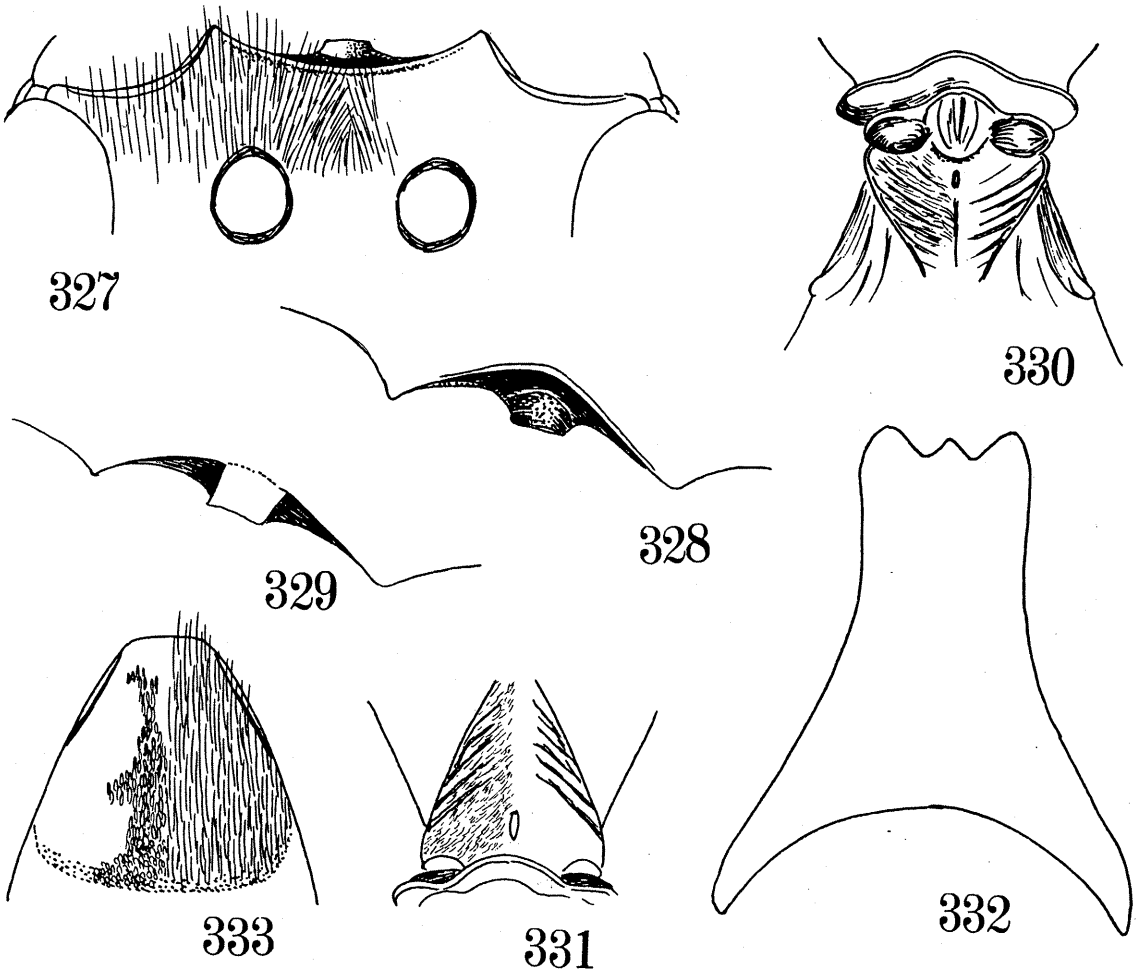
Length 18 mm, wings strongly darkened, hair silvery, not dense, pile bands on gaster on GT1-3. HW,HL,IODv,A3=100,42,17.5,20. HW,HL,IODc=100,82,42 (IODc at base of mand dible 64). IODv,IODc,CML=10,28,22. AOD,WAS,IAD=7,5,4. CML:CLL=20:8. A2,3,4,5,10,11, 12=4,10,10,10,7,6.5,6.5. A3=AW×3. Rhinaria on A5-11, on 8 longest, subpointed on both ends, less than half the length of the joint, on A5 small, about 1/5 the length of the joint, located near apex beneath. Clypeus: Fig. 225, apical margin of the median produced part raised at its median half like a blunt carina and medianly deeply roundly hollowed, the hollow deep and its bottom becomes a small rounded incision anteriorly, showing that the clypeus is very thick, disc gently roundly elevated and medianly longitudinally raised into a short blunt carina, but from the end of which surface obliquely inclined deep into interantennal hollow. Mandible near base beneath triangularly incised as in ♂ (Fig. 322), inner margin shortly and bluntly bidentate. Propodeal dorsum without lateral carinae, but with a short medial carina. Pygidial area: Fig. 226, surface at base broadly roundly elevated and elevation medianly further extended posteriorly, covering hair dark coppery, on apical area only yellowish, seen obliquely from the side appears more bright coppery, erect bristles short, sparse, similar in colour to the hair. Mesoscutum finely, closely punctured, mesopleuron very finely microcoriaceous, bearing somewhat a velvety lustre, on epimeral area almost without puncture, below scrobal furrow very sparsely scattered with fine shallow, rather indistinct punctures; propodeal dorsum obliquely, somewhat sparsely striate all over, sides also obliquely (nearer to transverse) striate, striae posteriorly weaker. Longitudinal carina on outer side of hind tibia highly raised into fin-shape, including 5 short spines in it in this specimen.

II. TWO NEW SPECIES OF THE GENUS LYRODA SAY

1. Lyroda philippinica sp. nov.

The present species (♂) has the clypeus at medio-apical margin roundly emarginate (Fig. 227) and in this respect closely resembles Lyroda venusta Bingham that was newly designated, but differs from this in the following distinctions: (1) medio-apical prominece of clypeus bevelled not directly from anterior margin, but from a step below it (Fig. 328, antero-ventral view, cf. Fig. 329 in venusta) and its surface not flat and polished, but transversely, gently, roundly raised and minutely shagreened, (2) basal platform of GT1 different in form and surface sculpture (Fig. 230, 231 vertically seen from fore side, cf. Fig. 194), (3) sternite 8 is much broader (Fig. 232, cf. Fig. 196), (4) scutellum and postscutellum almost without medio-apical ridge, (5) head seen from above with post-ocular area till occipital margin much narrower (compare measurements), (6) vestiture pale brassy, not silvery.

♂. 8.5 mm. Black, mandible ferruginous, in frontal view apical third and inner



Figs. 327-328, 330-333: Lyroda philippinica sp. nov., ♂
Fig. 329: L. venusta Bingham, ♂

margin dark reddish brown, in lateral view extreme base and apex of ventral tooth and ventral margin till tooth black, apical area merely reddish brown, tibial spurs, all claws and spines at apical area of mid and hind tibiae ferruginous, but spurs in some light appearing dark brown, rest of spines of legs whiiish, tegula transparent pale brown, anterior and inner parts broadly dark, wings hyaline, apically slightly darkened, veins dark brown, costa, subcosta and stigma nearly black. Vestiture pale brassy, but on mesopleuron, propodeum and femora of legs rather silvery.

HW,HL,IODv,A3=100,54,51,18. OOD,Od,POD,OCD=6.5,3,7,25. Seen vertically to face

above antennae HW,HL,IODv,IODm,IODc=100,68,51,55,52. AOD,WAS,IAD=6,4.5,6. CML:CLL=10:6. A2,3,4,5,11,12,13=6,10,8,8,6,6,9. A3=AW×3 (dorsal). In fore wing abscissae 1,2,3,4, 5 of radial vein with relative length =8,3,7,9,3, abscissa 5 oblique to costa, accessory cell fairly distinctly margined with obscure vein, apical area narrowly parallel, with apex open (in venusta closed).

Punctation and sculpture on head, thorax and propodeum generally similar to those of venusta, but on propodeal dorsum medial carina shorter, weaker, subreticulate surface sculpture slightly finer and weaker, especially marked on medio-posterior area. GT7: Fig. 333, sternite 8: Fig. 332, genitalia had been pulled out and are lost.

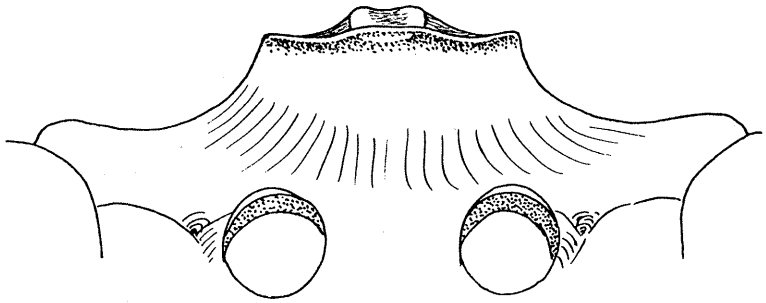
♀, unknown.

Holotype: ♂, Leyte, Palo, 16-22. IV. 1982, T. Tano leg. (Coll. Tsuneki).

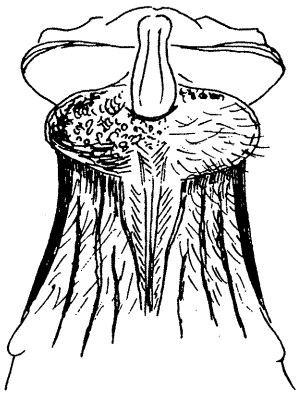
2. Lyroda pagsanjan sp. nov.

The present species is considerably similar in the form of apical margin of median lobe of clypeus in ♂ to Lyroda williamsi m., but differs from it at least in the ventral view of genital organs, the sole reliable specific character of this species. It is also close in this character to L. laguna m. and L. japonica takasago occurring in Formosa, but differs from both of them in the structure of the basal platform of GT1 and in the form of epipygium and GS8 etc. and can easily be separated from these.

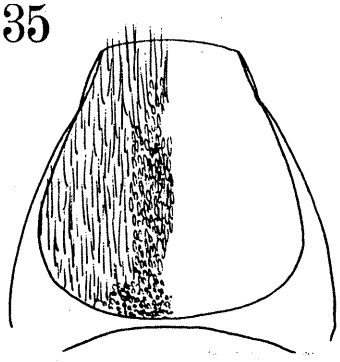
♂. Length 7.5 mm. Black; mandible largely ferruginous, tegula at outer and poste-



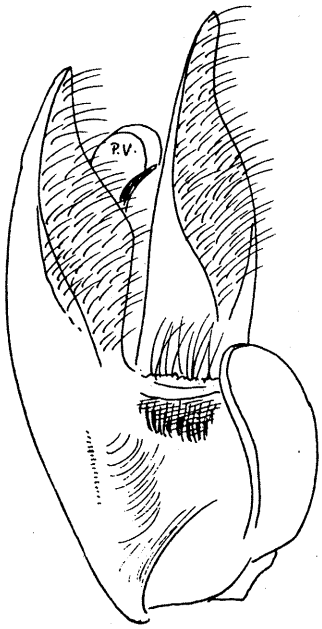
334



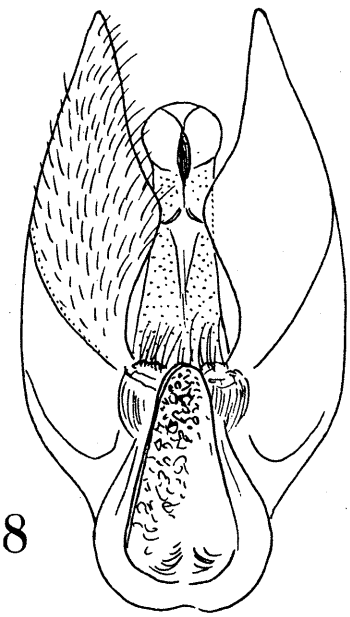
335



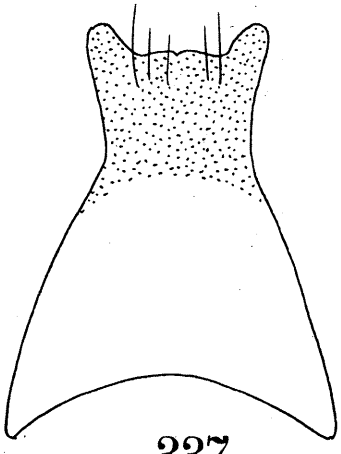
336



339



338



337

rior area translucent pale brown, tibial spurs, all T5 with claws pale brown. Wings hyaline, apically very weakly clouded. Hair silvery, on pygidial area brownish yellow.

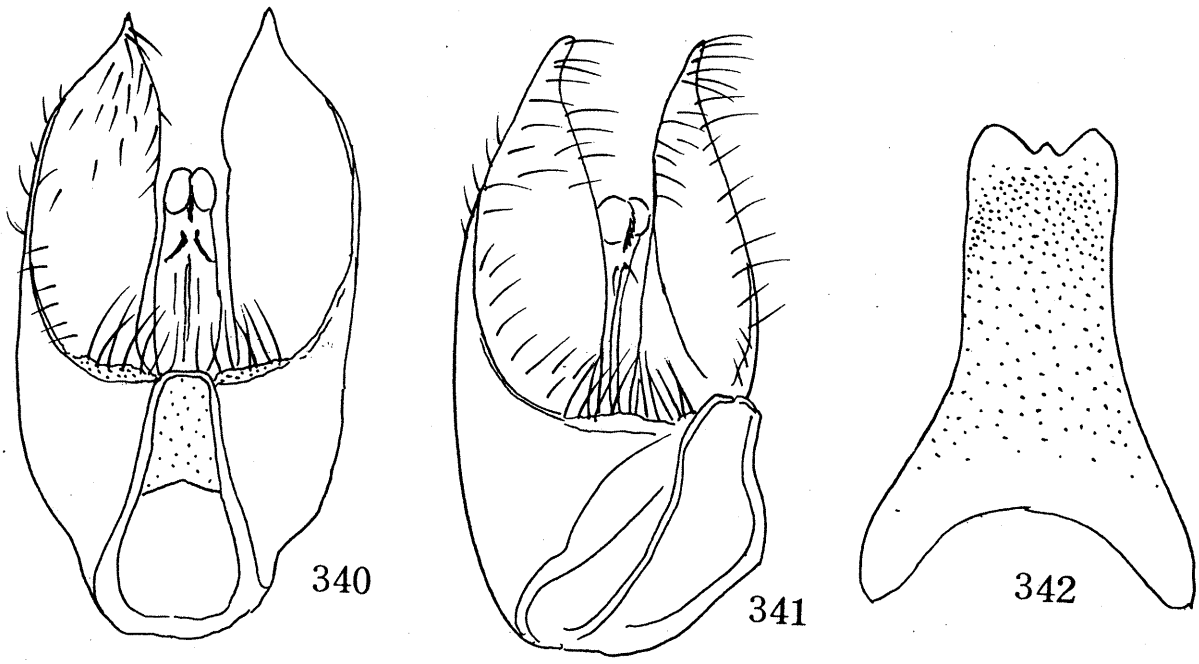
HW,HL,IODv,A3=100,53,49,16. OOD,Od,POD,OCD=6,3,7,26. HW,HL,IODv,IODm,IODc=100, 49,53,56,52. AOD,WAS,IAD=6,5,6. CML:CLL=20:17. A2,3,4,5,11,12,13=6.5,10,10,10,7,7,13. A3=AW×2, =BW×3 (both dorsal). Abscissae 1,2,3,4,5 of radial vein relatively =12,3,11,14, 3. Accessory cell margined with somewhat weak vein, narrowly extended apically, with a pex closed.

Clypeus: Fig. 334, medio-apical prominence bevelled directly from antero-dorsal margin, surface smooth and polished, but not flattened, transversely gently roundly excavated; scutellum and postscutellum at medio-apical area longitudinally and shortly ridged, but the ridges not strong. Propodeal dorsum medianly carinate, surface comparatively strongly and coarsely rugoso-reticulate, intervals of rugae minutely rugulose, not shining, on lateral areas sculpture turns much stronger and coarser, meshes more regular, subquadrate, giving rise to 2-3 longitudinal, somewhat rugosed carinae there, as if to be lateral carinae, posterior aspect medianly furrowed and laterally carinated, but the carinae confined to posterior part only, surface irregularly rugoso-reticulate as on central part of dorsum, but the sculpture finer and weaker on posterior area. Basal platform of GT1: Fig. 335, surface irregularly, coarsely punctured, from central area a furrow extended posteriorly, cutting open the posterior margin of the platform, behind the platform several rugosed carinae longitudinally run, the outermost ones the strongest, but the platform and its posterior area covered with short, thick, silvery hair and the surface sculpture not well visible under natural condition (under oblique light the carinae become visible). Pygidial area: Fig. 336, apical margin broader than usual, lateral carinae short, on apical part only developed. GS8: Fig. 337, genitalia in ventral view: Fig. 338, ventro-lateral view: Fig. 339.

Vertex and frons very finely and closely punctured, PIS shining, mesoscutum similarly punctured, but punctures slightly larger, deeper, stronger, subreticulate, PIS not shining (on natero-median furrow punctures finer and weaker), on mesopleuron punctures piliferous and much finer and weaker than on scutum and below scrobal furrow (only the lower margin of the roundly and highly raised epimeral area) much sparser; side of proposeum above spiracular furrow obliquely, strongly and coarsely rugoso-striate, on the rest finely, fairly closely punctured, PIS shining, but at extreme posterior area a few fine, rugosed striae observed.

♀, unknown.

Holotype: ♂, Luzon, Prov. Laguna, Pagsanjan, 7-9. VIII. 1978, H. Kurokawa leg. (Coll. Tsuneki).



Figs. 340-342, Lyroda philippinica sp. nov.

FURTHER ADDENDA

The additional specimens of Lyroda received while the press was going on brought about one correction, one supplement and one new species:

(1) Lyroda pagsanjan sp. nov. is a variation of Lyroda laguna sp. nov.

Because two male specimens (Luzon, Pagsanjan, 7-9.VIII.1978) show the intermediate characters between the 2 species compared.

(2) Genitalia and sternite 8 of Lyroda philippinica sp. nov. were examined:

Figs. 340-342 (material: 2 ♂, Leyte, Palo, 16, 22.IV.1982). Characteristic is that the parameral hair is very scarce and GS8 is very slender.

(3) LYRODA ALAMINOS SP. NOV.

♂. Clypeus: Fig. 343, genitalia: Figs. 348-349 (p. 117), sternite 8: Fig. 347. Length 6.5 mm. Black, mandible reddish brown, at base and apical area dark red, tegula translucent brown, tibial spurs pale brown, all T5 brown. Hair on lower frons, clypeus, pronotum and mesoscutum with distinct brassy tint, on other areas silvery, pile bands on apical margins of GT1-3 distinct, silvery, apical margin of GT6 densely covered with somewhat brassy hair, longer than those of pile band, pygidial area of GT7 also closely covered with somewhat long hair, but here the hair is silvery. Measurements:

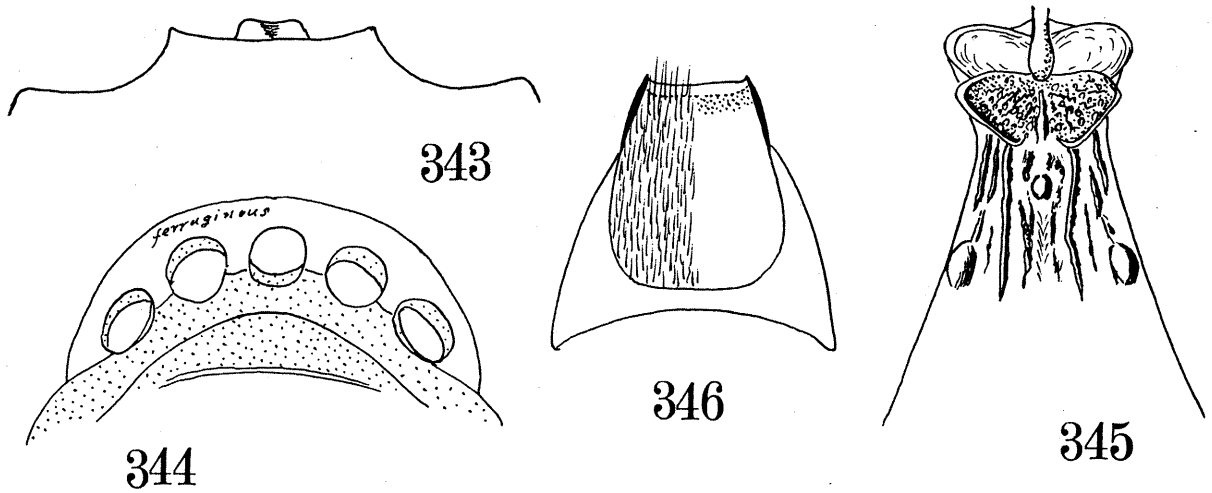
HW,HL,IODv,A3=100,48,48,16. OOD,Od,POD,OCD=11,5,12,20. HW,HL,IODv,IODm,IODc (in frontal view) =100,76,48,56,51. VML:CLL=20:16. A2,3,4,5,11,12,13=6,10,9,9,8,7,11. A3=AW×2.5(dorsal). AOD,WAS,IAD=6,5,6. Abscissae of raidal veins 1,2,3,4,5=13,3,13,16,3. those of cubital vein 1,2,3 of cell 2 = 3,8,9 (same scale as above).

Clypeus (Fig. 343) with medio-apical margin gently emarginate, but not so strong as in venusta or in philippinica, median prominence from dorso-apical margin strongly bevelled, hence seen vertically to clypeal disc appears short, but seen somewhat from beneath moderately long and distinctly inclined to its medial line, that is to say, medianly longitudinally furrowed. Series of 5 holes at nape region of pronotum more regular, uniform and somewhat smaller than in philippinica (Fig. 344). Scutellum medio-posteriorly, postscutellum in middle minutely tuberculate, propodeal dorsum medianly distinctly carinate, reaching near apex, without lateral carinae. Basal platform of GT1: 345; pygidial area: Fig. 346, GS8: Fig. 347, genitalia: Figs. 348 and 349, paramere on ventral surface closely covered with short setae.

Vertex and frons finely, closely punctured, mesoscutum somewhat more largely, more strongly and very closely punctate-reticulate, mesopleuron punctured as on frons, but punctures piliferous, propodeal dorsum coarsely, irregularly (but mainly obliquely) rugoso-reticulate, posterior aspect similar (but main course of rugae transverse), sides on dorsal half similarly rugoso-reticulate, on lower area simply finely closely punctured; gaster very finely and very closely punctulate.

♀, unknown.

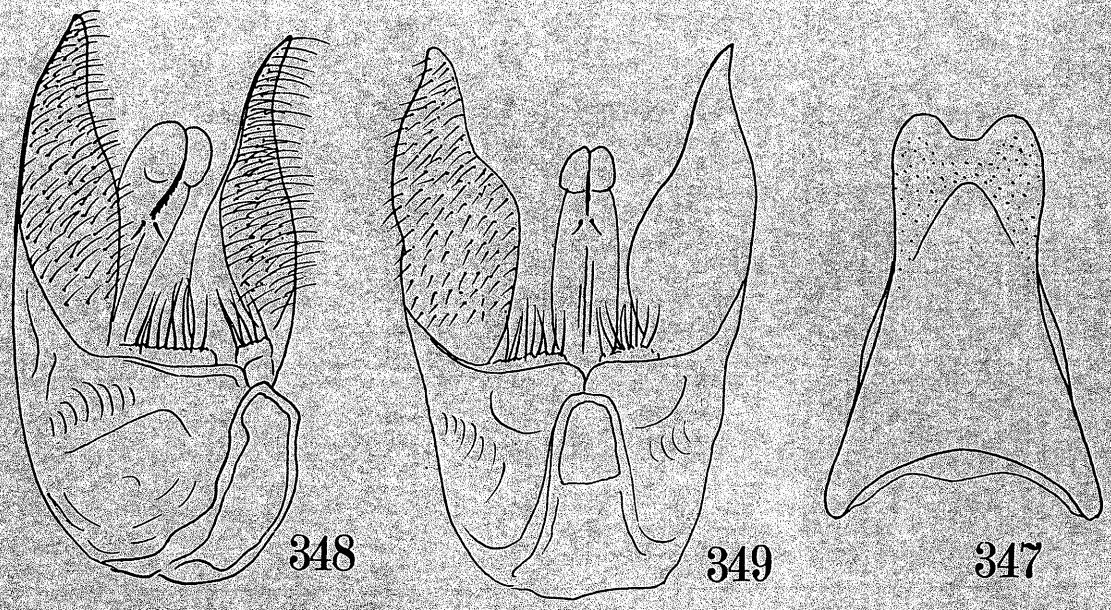
Holotype: ♂, Luzon, Prov. Laguna, Alaminos, Hidden Valley Spring, 6. VIII. 1978, H. Kurokawa leg. (Coll. Tsuneki).



Figs. 343-346. Lyroda alaminos sp. nov., ♂.

INDEX

(Names with asterisk are new species)



Figs. 347-349. Lyroda alaminos sp. nov., ♂.

SPECIAL PUBLICATIONS OF
THE JAPAN HYMENOPTERISTS ASSOCIATION
NO. 24
Published on January 20, 1983.

Price Y. 4500. Order should be made through one of the book dealers in Japan.

All the communications relating to the Publications should be addressed to

Dr. K. Tsuneki
Asahigaoka 4-15,
Mishima, Japan 411.