

RACHICERIDAE (Diptera) FROM THE ORIENTAL AND PALAEARCTIC REGIONS¹

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Abstract: This paper describes 24 new species of the genus *Rachicerus* from the following localities: New Britain (1 species), New Guinea (2), Java (2), Sumatra (1), North Borneo (6), Philippines (1), Malay (1), Thailand (3), Ceylon (2), India (2), Taiwan (1), and South China (2), and presents a key to species of the family Rachiceridae known from the Oriental and Palaeartic regions.

The Rachiceridae is at least mostly composed of the members of the genus *Rachicerus*, and contains 61 species (excluding the fossil ones) whose distribution includes the Oriental Region (a total of 44 species; New Britain 1, New Guinea 2, Moluccas 1, Java 3, Sumatra 5, Borneo 6, Philippines 4, Taiwan 6, South China 2, Malay 1, Thailand 3, Burma 2, Ceylon 4, and India 4), the Palaeartic (3 species; Spain 1, East China 1, and Japan 1), the Nearctic (5 species), and the Neotropical Region (9 species; Mexico 1, Costa Rica 1, Panama 1, Cuba 1, and Brazil 5), and of these species 24 from the Oriental Region are here described as new to science.

Leonard (1930) and Carrera (1945) revised the Nearctic and Neotropical species, and Frey (1954) prepared a key to the Oriental species. This paper gives a revised and enlarged key to the Oriental and Palaeartic species. Nomenclatural decisions of existing species were based on the original descriptions (except for *galloisi* Séguy). This key will probably soon be obsolete for a vast number of undescribed species may be still present.

The members of this family are poorly represented in collections and the majority have been described from a single specimen. So, the question arises as to the range of individual variation and this has not been solved here. The number of flagellar segments in the antenna varies with the individual and the sex within the species (Table 1). The longitudinal grooves in front may vary considerably in number within the species.

In the description the lengths of the 1st 2 antennal segments were measured along the mid-outer surface and that of each segment of the leg along the dorsal surface, and the names of the pleural divisions were determined according to Curran (1934: 489).

The following symbols indicate the institutions in which specimens are stored: BISHOP (Bernice P. Bishop Museum, Honolulu), BMNH (British Museum (Nat. Hist.), London), NTU (National Taiwan University, Taipei), USNM (U. S. National Museum, Washington, D. C.), KU (Kyushu University, Fukuoka), and KA. U (Kagoshima University, Kagoshima).

1. Partial results of a grant to Bishop Museum from the U. S. Public Health Service, National Institutes of Health (AI-01723-08).
2. Bishop Museum, Honolulu, Hawaii. (Permanent address: Faculty of Agriculture, Kagoshima University, Kagoshima).

Table 1. Number of flagellar segments in some Nearctic *Rachicerus**.

| Name of species | Sex | No. of individuals examined | No. of flagellar segment | | |
|-------------------------|-----|-----------------------------|--------------------------|---------|---------|
| | | | Minimum | Maximum | Average |
| <i>R. fulvicollis</i> | ♂ | 6 | 31 | 33 | 32 |
| Walker | ♀ | 1 | — | — | 18 |
| <i>R. honestus</i> | ♂ | 4 | 19 | 21 | 20.3 |
| Osten Sacken | | | | | |
| <i>R. nitidus</i> | ♂ | 1 | — | — | 22 |
| Johnson | ♀ | 15 | 18 | 24 | 20.7 |
| <i>R. obscuripennis</i> | ♂ | 14 | 21 | 28 | 25.3 |
| Loew | ♀ | 10 | 21 | 29 | 24.3 |

Note : *I studied these at U. S. National Museum.

I wish to express my sincere thanks to Dr Harold Oldroyd (London), Dr Shi-tao Yie and Mr Y. I. Chu (Taipei), Dr Willis W. Wirth (Washington, D. C.), Mr Yorio Miyatake (Fukuoka), and Mr Kenji Koizumi (Kôbe Plant Protection Station, Kôbe) for their loan of the material and to Dr Kanetosi Kusigemati (Kagoshima) for his assistance in preparing the photographs and Mr Toyohei Saigusa (Fukuoka) for his help in making the drawing. I am also indebted to Dr J. Linsley Gressitt and Dr Laurence W. Quate (Honolulu), Dr Masatake Shibuya (Kagoshima), and Dr Keizo Yasumatsu (Fukuoka) for their support.

Genus *Rachicerus* Walker

Rachicerus Walker, 1854, *List Dipt. Brit. Mus.* 5, Suppl. 1: 103.

Rhachicerus, error or emend.

Rhyphomorpha Walker, 1861, *J. Proc. Linn. Soc. London* 5: 275.

Antidoxion Snellen van Vollenhoven, 1863, *Versl. Meded. Kongl. Akad. Wetensch. Afd. Naturk.* 15: 1.

Rhachicerella Enderlein, 1921, *Mitt. Zool. Mus. Berlin* 10: 167. **New Synonymy.**

Type-species: *Rachicerus fulvicollis* Walker.

Eyes widely separated in both sexes and each eye at frontal margin with a shining black incision which very often disappears; front broadest above antennae and then tapering towards ocellar tubercle and with a band of white-gray pollen just above antennae whose length (at middle) is about 1/3-1/4 distance from antenna to median ocellus; lateral ocelli situated at or somewhat before line drawn between upper corners of eyes; face, whose median part is concave especially at lower part and does not form a swelling, narrower than front and tapering towards proboscis; usually total width of head about 5× width of face at lowest portion from a direct frontal view and about 3× width of front at broadest point; length of face equal to or roughly so distance from antenna to median ocellus; cheeks not developed below eyes; antenna 2+13 to 2+39 segmented, segment 1 much longer than but about as wide as segment 2 which is always wider than long (2-5×), and flagellum serrate or pectinate (in each segment of flagellum distal part is wider than basal part, and ventral part is usually greatly developed and forms a "lower process" which is not present on last segment as a

general rule); palpi, which are 2 segmented, and proboscis are well developed but are not extending beyond base of antenna.

Postscutellum (= so called metanotum) well developed.

Tibial spurs 1:2:2; hind coxa near middle with a ventral process which appears to be lacking in some species, however; in hind tibia, terminal spur about equal in length to width of tibia.

Five posterior cells present but in some species vein M_2 rudimentary; 4th posterior cell and anal cell closed; vein R_3 joining costa near apex of vein R_{1+2} or sometimes ending at vein R_{1+2} before wing margin; 1st section of R_s near apex, 1st section of M (which forms boundary between 1st and 2nd basal cell) near apex, and 1st section of M_3+M_4 (which forms boundary between 2nd basal and discal cell) near base are interrupted (veins become paler in color); thickening of costa ending at or near wing-tip.

In ♀ abdominal segment 6 abruptly becomes much narrower than preceding segment and forms ovipositor together with segments 7-8.

Pile on body short and thin; antennal flagellum covered with pubescence and pile on metapleura confined to its anterior part.

The structure of head and its appendages does not differ with the sexes but in the ♀ the lower processes of antennal flagellum are usually much shorter than in the ♂ (see fig. 17-18).

R. fulvicollis Walker of North America, type-species of *Rachicerus*, has front with sides parallel, vein R_3 joining costa far beyond apex of vein R_{1+2} , and antennal flagellum of ♂ subpectinate with processes being a little longer below than above and that of ♀ not pectinate but serrate (after Leonard, 1930, p. 11 and pl. 3, fig. 18).

Enderlein (1921: 167) erected the genus *Rhachicerella* (type-species: *Rhachicerus honestus* Osten Sacken of N. America), giving the following diagnosis: "Geiseliglieder nur mit kurzen Verbreiterungen nach oben und unten, so das die flachen Glieder von der Seite gesehen gestielt erscheinen; r_{2+3} gerade, parallel zu r_1 und nicht in die Spitze von r_1 oder dicht daneben endend."

Rhachicerella is quite the same as *Rachicerus* and if the characters just quoted are sound in differentiating the genus, *Rhyphomorpha* should be revived.

Loew (1850) erected the genera *Chrysotemis* and *Electra* from the fossil specimens found in "ostpreussischen Bernstein," and Enderlein (1921: 167) redescribed the latter genus as follows: "... Geiseliglieder kürzer als breit, sie besitzen eine Spur einer seitlichen Verbreiterung, viel weniger als *Rhachicerella* und anscheinend nur nach einer Seite hin..... Die Palpen und die Rüssel scheinen sehr kurz und stummelförmig zu sein."

Frey (1954) created the genus *Gymnorhachicerus* (type-species: *Gymnorhachicerus pilosus* Frey of Burma) in which the metapleura is bare, and relegated to *Electra* 1 species (*relicta* Frey of Philippines) in which "Alle Fühlerglieder [namely, 1st 2 segments and flagellar segments] beim ♀ gleichartig, ohne Fortsätze."

I have not seen any specimen of *Chrysotemis*, *Electra*, and *Gymnorhachicerus* and cannot definitely state the distinguishing characters.

Rachicerus is similar to *Xylophagus* Meigen, 1803 (Xylophagidae) and *Solva* Walker, 1860 (Solvidae) in the eyes being widely separated in both sexes and the postscutellum (the so called metanotum) being well developed.

Xylophagus, in which the tibial spurs are 1 : 2 : 2 as in *Rachicerus*, differs from *Rachicerus* by having the following points : antennal flagellum 8-segmented, neither serrate nor pectinate, and with last segment obtuse at tip ; in ♀ lower part of front and upper part of face produced forward ; cheeks well developed below eyes ; postscutellum more developed than in *Rachicerus* ; 4th posterior cell widely open.

Solva, in which the 4th posterior cell and anal cell are closed as in *Rachicerus*, differs from *Rachicerus* by having the antennal flagellum 8-segmented and neither serrate nor pectinate, the face with a median swelling, and the tibial spurs 0 : 2 : 1 or 0 : 2 : 2.

Enderlein (1913 and 1921) placed *Rachicerus* in the Solvidae on grounds of its wing-venation. But de Meijere (1915) asserted that *Rachicerus* is more closely related to *Xylophagus* than to *Solva* on grounds of the structure of the prothorax, the shape of abdomen, and the number of tibial spurs, and Frey (1954) placed the Rachiceridae and the Xylophagidae in the Tabanoidea and the Solvidae in the Stratiomyoidea.

I prefer de Meijere's view to that of Enderlein. In *Solva* the prosternum and the propleura are entirely confused with each other and the sclerite thus formed is very large in area, while in *Rachicerus* and *Xylophagus* they are separated from each other or at least constricted between them, and are not so large in area. As to the shape of the terminalia of both sexes the difference between *Solva* and *Rachicerus* appears to be larger than that between *Xylophagus* and *Rachicerus*, although the study of the terminalia of *Solva* and *Xylophagus* has not been made carefully ; this will be done in the near future.

Paleorachicerus new name for *Electra* Loew

Each of the names *Chrysotemis* Loew and *Electra* Loew mentioned in the preceding section was preoccupied by another one (after *Nomenclator Zoologicus*). The description of "Chrysotemis" is very short and the specimen upon which the genus is erected appears to be very incomplete and there is a probability that "Chrysotemis" is a synonym of "Electra." It seems to be not certain that *relicta* Frey is a true *Paleorachicerus*.

On the wing venation

The members of the genus *Rachicerus* may be divided into the following 4 categories according to the wing venation : (1) vein M_2 rudimentary and vein R_3 ending on R_{1+2} before wing margin ; (2) M_2 rudimentary and R_3 ending on costa ; (3) M_2 complete and R_3 ending on R_{1+2} before wing margin and (4) M_2 complete and R_3 ending on costa. Of the 24 species described here as new, 3 (*fluidus*, *tenuiculus*, and *tenuis*) belong in (1), none in (2), 3 (*flabellum*, *guttatus*, and *spissus*) in (3) and the remaining 18 in (4). As to the already known species, the situations are vague but it is certain that *aterrimus* Senior-White and *unicinctus* Brunetti fall into (3) and *galloisi* Séguy and *patagiatus* Enderlein into (4), and in *bilineus* Walker and *omissinervis* de Meijere M_2 is rudimentary while in *pictipennis* Kértesz and *proximus* Kértesz M_2 being complete, and it seems that the ones other than the species mentioned above are mostly relegated into (4).

KEY TO SPECIES OF RACHICERIDAE FROM THE
ORIENTAL AND PALAEARCTIC REGIONS

1. Antennal flagellum either serrate or pectinate 2
 Antennal segments 1 and 2 and flagellar segments equal in form and neither serrate nor pectinate; metapleura with long hairs; head dark brownish red; proboscis and palpus pale yellow; antenna 2+21 segmented and yellowish (in ♂ flagellum broken off); thorax brownish red and shining, but humeral callus and scutellum yellowish white; haltere yellowish white; coxa dark brownish red; femur brownish yellow but apex brown; tibia and tarsus yellowish white but apical ½ of hind tibia brown; wing gray and almost hyaline; abdomen dark brownish red and somewhat shining; body ♂ 5 mm and ♀ 6 in length (1♂, 1♀; St Cruz, Scyte, Philippines) **Paleorachicerus relicta** (Frey, 1954)
- 2 (1). Metapleura distinctly haired (the genus *Rachicerus*) 3
 Metapleura bare; head shining black; palpus blackish brown; antenna 2+18 segmented and entirely blackish brown; thorax entirely shining black; haltere pale; leg reddish yellow, but apical ⅓ of hind tibia blackish brown; leg with comparatively long and dense white hairs; wing faintly tinged with brownish; abdomen shining black; body 4.5 mm and wing 4 in length (4♂♂; Kambaiti, Burma)
 **Gymnorhachicerus pilosus** Frey, 1954
- 3 (2). Mesonotum pale brownish, yellowish brown or orange yellow; if dark brownish to blackish parts on mesonotum larger in area, abdomen largely yellowish brown or orange yellow 4
 Mesonotum dark brownish to blackish, although humeral callus usually whitish to pale brownish 28
- 4 (3). Abdomen dark brownish to blackish 5
 Abdomen yellowish brown or orange yellow 9
- 5 (4). Wing with a darker incomplete band in middle (in *zonatus*, *fulvicornis*, and *miyatakei*) or stigma of wing darker (in *robinsoni*) 6
 Wing faintly tinged with dark brown and stigma not marked, vein M₂ entirely lacking and vein R₃ ending on R₁₊₂ before wing margin; head shining dark brownish to blackish, palpus (except apical part which is dark brownish) and proboscis yellowish brown; antenna 2+14 segmented, yellowish brown but in flagellum segments 4 (or 5) -14, lower processes on segments 11-13, and apical parts of lower processes on segments 3-10 dark brownish; thorax and haltere yellowish brown (mesonotum may have 3 indistinct rather broad dark brownish stripes of which lateral ones may be broadly interrupted in middle); leg yellowish brown, with last 2 segments of tarsus slightly infuscated; abdomen dark brownish, but segments 1-2 and genitalia yellowish brown; body (without antenna) and wing 4 mm in length (1♂; NE New Guinea) **fluidus***
- 6 (5). Hind leg largely reddish brown 7
 Hind leg entirely black, fore leg brownish but tarsus except basal portion of basitarsus blackened (mid leg lacking, except coxa and trochanter which are blackish); head shining black, palpus and proboscis brownish to dark brownish; antenna 2+26 segmented, dark brownish but in flagellum lower processes of segments 1-4 largely brownish, and those of apical several segments and entire surface of last segment pale yellowish brown; thorax reddish brown but pleura largely blackish; wing tinged with dark brownish, costal, apex of subcostal, marginal (except apex and basal part), and 1st basal cell darker and a region from stigma to base of discal cell slightly so; abdomen entirely black; body (without antenna) 9 mm

* Described as new.

- and wing 7 in length (1 ♂; Thailand) **miyatakei***
- 7 (6). Thorax with blackish parts; wing with a darker incomplete median band 8
 Thorax and haltere entirely orange; wing brownish orange with stigma dark brown; head shining black, palpus orange; antenna 2+28 segmented, black but segments 1-2, and basal 1/2 of segments 3-4 orange; lower processes of flagellum except for those on apical segments are a little longer than depth of segments; fore and mid legs orange, but hind leg blackish brown; abdomen blackish, but segment 1 and membraneous part orange; body 14 mm and wing 10 in length (1 ♀; Korinchi, W. Sumatra). **robinsoni** Edwards, 1919
- 8 (7). Mesonotum brownish yellow with 2 ill-defined black parallel stripes (which are almost coalescent on their inner sides, occupy middle of dorsum and nearly reach scutellum) and with 1 interrupted black stripe (which does not reach root of wing) behind each humeral callus which is pale yellow; pleura reddish brown but portion between root of wing and fore coxa shining black; scutellum yellowish red; haltere yellowish brown with knob brown; front and vertex shining black, occiput dark reddish, and palpus and front just above antennae reddish brown; antenna 2+28-29 segmented, reddish brown; leg reddish brown but base of hind coxa brown and extreme tip of hind tibia and last 2 or 3 segments of tarsus brownish; wing subhyaline with a brownish band from costa to base of discal cell; "the latter half of the wings, beyond the central crossvein is slightly tinged with grayish"; abdomen shining black with a dark reddish band at base of segment 2; body (without ovipositor) 12-13 mm in length (1 ♀; Mount-Singalang, Sumatra)...
 **zonatus** Osten Sacken, 1881
 Similar to *zonatus*, "but differs in being a little larger; the antennae are comparatively longer, the thorax and abdomen have more red in their coloring; the wings have a more brownish tinge, especially on the distal half; the cloud in the middle is much larger; the halteres altogether reddish. It is singular that Snellen v. Vollenhoven attributes 26 joints to the antennae; his own type in Leiden (which I saw) has 34-35 joints" (after Osten Sacken 1881: 409) (1 ♀; Java)
 **fulvicornis** (Snellen v. Vollenhoven, 1863)
- 9 (4). Dorsum of abdomen entirely brownish yellow, although intersegmental membranes or genitalia and ovipositor may be dark brownish to blackish 10
 At least some terga of abdomen with dark brownish to blackish bands 15
- 10 (9). Pleura entirely yellowish (or reddish) brown 11
 Pleura with dark brownish to blackish parts 12
- 11(10). Wing faintly tinged with brown, but costal-, subcostal-, and 1st basal cell yellowish brown and *stigma*, apex of subcostal cell and a region from base of stigma to base of discal cell dark brownish; head shining chestnut brown or shining black, palpus and proboscis yellowish brown; antenna 2+32-39 segmented in ♂ (2+? segmented in ♀) and yellowish brown but flagellum except for lower processes, last 1 (or 2) and 1st (or several basal) segments dark brownish; thorax yellowish brown (mesonotum may have 3 or 4 narrow dark brownish to blackish stripes); haltere yellowish brown; leg yellowish brown but in ♂ basal more than 1/2 of hind tibia and dorsoproximal part of hind basitarsus tinged with dark brownish; body (without antenna and ovipositor) ♂ 9-12.5 mm, ♀ 9-14, and wing ♂ 8-11, ♀ 9.5-15 in length (4 ♂♂, 3 ♀♀; Fukien, S. China) **maai***
- Stigma of wing not marked (wing tinged with yellowish brown, apex of costal cell, apical portion of subcostal cell and a region from just above fork of Rs to base of discal cell darkened); head and its appendages yellowish (or somewhat reddish) brown, front (except just above antennae), ocellar triangle and antennal flagellum .

- (except lower processes, 1st 3 or more and last 6-7 segments) darkened; antenna 2+28 segmented; thorax, haltere, and leg yellowish (or somewhat reddish) brown; body (without antenna and ovipositor) 13 mm and wing 15 in length (1 ♀; Malay) **opulentus***
- 12(10). Wing hyaline with brown regions (fig. 35 of Kertész 1914: 502); leg yellow, but in hind leg coxa black, femur yellowish brown, tibia except for anterobasal area and apex blackish brown, and tarsus somewhat darkened 13
Wing hyaline or entirely tinged with brown 14
- 13(12). Antenna 2+36 segmented, and segment 1 dark brown, segment 2 brownish yellow, and flagellum brownish black except last 8 segments which are white, but lower processes (except bases and apices) yellowish brown; head shining black, occiput dull black, and palpus and proboscis brownish yellow; pleura black, but ptero-, anterior part of meso-, and upper part of sternopleura yellowish white; mesonotum pale brown with 2 black stripes and with a larger black spot behind yellow humeral callus; scutellum yellow and haltere brownish yellow; abdomen brownish yellow and slightly shining, intersegmental membranes blackish brown and posterior border of each sternum yellowish white; body (without antenna) 11 mm, wing 10, antenna 4.5 in length (2 ♂♂; Kosempo, Taiwan) **pictipennis** Kertész, 1914
Antenna 2+31 segmented; body about 8 mm, wing 7, antenna 3 in length (it is highly probable that this species is a synonym of *pictipennis*) (1 ♂; Taihorin, Taiwan) **proximus** Kertész, 1914
- 14(12). Mesonotum yellowish brown with 3 dark brown stripes of which middle one is about 2 × as broad as lateral and with 3 dark brown spots which are situated behind humeral callus (which is whitish yellow), before and behind suture respectively; pleura, scutellum, postscutellum, and haltere brownish yellow but meso- and upper part of hypopleura blackish brown; front shining dark brown, occiput dull black, and palpus and proboscis yellow; antenna 2+18 segmented and black but segments 1 and 3 (=basal segment of flagellum) and lower processes (except those on last 3 segments) yellowish brown; leg yellow, but in hind leg base of femur and that of tibia brown; wing hyaline; abdomen brownish yellow and waxy shining, intersegmental membranes black; body (without antenna and ovipositor) 7.5 mm, wing 8.3, antenna 2.7 in length (1 ♀; Fuhosho, Taiwan) **brevicornis** Kertész, 1914
Thorax brownish to dark brownish, but humeral callus, pro- and upper part of sternopleura yellowish brown and mesonotum with 3 darker stripes of which median one is very narrow and with 1 darker spot on notopleura; mesonotum paler in color in ♀ than in ♂; haltere yellowish brown; head dark brownish to blackish; palpus and proboscis yellowish brown; antenna 2+17-18 (in ♂) or 2+20 (in ♀) segmented, dark brownish but lower processes (except apical parts) on 1st 4-5 or more segments yellowish brown (in ♀ flagellar segments 1-3 and lower processes except those on last 6 or 7 segments, which are dark brownish, are entirely yellowish brown); leg yellowish brown to brownish but hind femur and hind tibia each except apical less than ½ somewhat darker (in ♀ these darker parts becomes smaller and inconspicuous); wing tinged with brown; abdomen yellowish brown to brownish, but genitalia or ovipositor and in ♀ intersegmental membranes dark brownish and shining; body (without antenna and ovipositor) ♂ 7-10 mm, ♀ 13 and wing ♂ 7-9, ♀ 13 in length (2 ♂♂, 1 ♀; Ceylon)..... **rusticus***
- 15(9). Mesonotum not as below 16
Mesonotum blackish but lateral part behind suture (which includes posterior callus) and posterior part yellowish brown; pleura, scutellum, postscutellum, and haltere yellowish brown; head and its appendages yellowish brown but ocellar triangle, vertex, median occipital region, and antennal flagellum (except lower processes

- and some basal segments) dark brownish to blackish; antenna probably 2+ nearly 30 segmented; leg and abdomen yellowish brown, but hind tibia except apical part, base of hind femur, and abdominal segments 4 and 5 dark brownish to blackish; wing rather strongly tinged with dark brown; body (without antenna and ovipositor) 14 mm, wing 14 in length (1 ♀; W. Sumatra)..... **opiparus***
- 16(15). Wing with a darker median band (which may not be so distinct in *varius*)..... 17
 Wing without a median band (which may be present in *varius*) 18
- 17(16). Wing yellowish brown, with a brown black median band which reaches to 4th posterior cell; costal and subcostal cell brownish black, and "Rand des Spitzendrittels graubraun gesäumt, ebenso alle Adern, aber mere oder wenig breit gesäumt"; head shining black, palpus yellowish brown; antenna 2+37 segmented and segment 1 black, segment 2 pale reddish yellow, flagellum blackish brown but last 7 segments and lower processes pale yellowish brown and basal segment yellowish brown; thorax reddish yellow, but mesonotum, anterior part of mesopleura, and postscutellum black, humeral callus and scutellum yellowish brown, and mesonotum with 2 narrow black stripes; haltere pale yellowish brown; leg pale yellowish brown but in hind leg, coxa black, basal 1/2 of femur infuscated with brown, tibia except apical 1/3 dark brown, and basal 1/3 of basitarsus reddish brownish; abdomen yellowish brown, but basal 1/3 of segments 1-5 blackish brown and ovipositor (=last 3 segments) except venter and sides of dorsum brownish; body (without ovipositor) 9.5 mm, wing 11 in length (1 ♀; Hoozan, Taiwan) (further description is given in p. 464) **patagiatus** Enderlein 1913
 Wing tinged with dark brown, costal, apex of subcostal, marginal (except apex and basal part), and 1st basal cell darker and a region from stigma to base of discal cell slightly so; head shining black, palpus and proboscis yellowish brown; antenna 2+27-28 segmented, 1st 2 segments yellowish brown, flagellum except lower processes blackish but last 5-6 segments pale yellowish brown, and lower processes yellowish brown or dark brownish (except those on apical and some basal segments); thorax yellowish brown but mesopleura except anterior part, hypopleura, and entire surface or antero-upper part of sternopleura dark brownish to blackish (sometimes ptero- and metapleura with dark brownish parts); haltere yellowish brown; leg yellowish brown, but trochanter and tarsus except fore and mid basitarsi and in hind leg entire surface or basal part of coxa, tibia except apical part and femur except base and apical part dark brownish to blackish; abdomen yellowish brown but tergum 1, tergum 5 (sometimes excepting apical and lateral parts), and sometimes basal part of tergum 4, that of sternum 5, and that of tergum 6 dark brownish to blackish; body (without antenna) 6-8 mm, wing 5.5-6.5 in length (3 ♂♂; Thailand) **varius***
- 18(16). Mesonotum at most with stripes which are narrow or indistinct or which are distinct but 2 in number 19
 Mesonotum with 3 distinct very broad blackish stripes with lateral ones broadly interrupted at suture (fig. 58); pleura with dark brownish to blackish parts (fig. 57); postscutellum dark brownish; haltere yellowish brown; head shining yellowish brown but ocellar tubercle, cerebrale, and occiput around neck dark brownish; palpus and proboscis yellowish brown; antenna 2+22-23 segmented, yellowish brown but flagellum except for basal parts of lower processes dark brownish; leg yellowish brown but tarsus especially last 4 segments darkened and in hind leg coxa, femur, and tibia (especially at middle) strongly tinged with dark brownish; wing faintly tinged with yellowish brown; abdomen yellowish brown, but dorsum with blackish parts (fig. 58); body (without antenna) 10 mm, wing 9 in length (1 ♂; N of Kalabakan, N. Borneo) **tigrinus***

- 19(18). Sternopleura entirely or partially dark brownish to blackish 20
 Sternopleura yellowish brown, reddish yellow, or orange yellow 24
- 20(19). Marginal cell and at least apex of subcostal cell darker; mesonotum without stripes 21
 21
 Wing not as above; mesonotum with a pair of stripes 22
- 21(20). Abdomen orange but hind border of each segment black although those of segments 5-6 less distinctly so; thorax orange, but sternopleura shining black and pleura with a large black spot in front of wing base and another just behind wing base; haltere yellow; head black, proboscis orange yellow; antenna 2+30 segmented, 1st 2 segments yellow and flagellum yellowish white but basal 23 segments except lower processes black; leg orange yellow but in hind leg coxa, tarsus, basal 2/3 of femur and that of tibia black; wing gray, subcostal- and marginal cell blackish; body 9 mm in length (1 ♂; Darjeeling, India) **nigricornis** Brunetti, 1920
 Abdomen not as above; see couplet 16 **varius***
- 22(20). Hind femur and hind tibia each except for apical portion dark brownish 23
 Leg yellowish brown but hind coxa and entire surface of hind tibia tinged with dark brownish; head shining blackish; palpus, proboscis, and antenna yellowish brown but antennal flagellum (except lower processes; apical part of flagellum broken off) dark brownish; thorax and abdomen yellowish brown, but 2 distinct stripes on mesonotum, meso- (except anterior part), sterno- (except posterior about 1/2), lower part of ptero-, and metapleura (except posterior part), and abdominal tergum 1, a median band on tergum 2, and anterior borders of terga 3-5 dark brownish to blackish (anterior part of sternum 5 and that of tergum 6 tinged with dark brownish); wing tinged with brown; body (without antenna) 8 mm, wing 7 in length (1 ♂; S. China) **pantherinus***
- 23(22). Thorax and haltere yellowish brown, but 2 stripes on mesonotum, and several parts of pleura dark brownish; *notopleura without spot*; head dark brownish to blackish and shining; palpus, proboscis, and antenna yellowish brown but *antennal flagellum except lower processes, entire surface of segments 1-4 and that of last segment dark brownish*; antenna 2+20 segmented; leg yellowish brown but hind femur except apical part and hind tibia except apical ca 1/2 and bases of fore and mid femora dark brownish; wing tinged with brown; *vein R₃ ending on R₁₊₂ before wing margin*; abdomen yellowish brown but tergum 1, a median band on tergum 2, anterior parts of terga 3-4, tergum 5, sterna 3 (or 4) -5, and segment 8 dark brownish; body (without antenna and ovipositor) 9-10 mm, wing 10-11 in length (2♀♀, W. Java) **guttatus***
- Thorax and haltere yellowish brown, but *a spot on notopleura* and 2 stripes on mesonotum, several parts of pleura brownish to blackish; head shining dark brownish to blackish; palpus, proboscis, and 1st 2 antennal segments yellowish brown; *antennal flagellum dark brownish to blackish but lower processes, entire surface of segment 1 and those of last 4 segments yellowish brown* (in ♂ apices of lower processes and upper surface of flagellar segment 1 distinctly dark brownish and color of apical parts of flagellum unknown); antenna 2+20 segmented; leg yellowish brown but in hind leg femur, tibia, and *basitarsus* each except apical part, and coxa, and in mid leg base of femur dark brownish; wing tinged with dark brown; abdomen yellowish brown but tergum 1, a median band on tergum 2, anterior borders of terga 3-5 blackish and segment 8 and sterna 2-5 tinged with dark brownish (in ♂ segments 4-7 and genitalia entirely blackish and sternum 2 almost entirely yellowish brown); body (without antenna and ovipositor) ♂ 10 mm, ♀ 8.5 and wing ♂ 8, ♀ 8.5 in length (1 ♂, 1 ♀; S. India) **plagosus***
- 24(19). In ♀ antenna 2+ roughly 20 segmented, yellowish brown but distal part of flagellum

- (at least portions except lower processes) dark brownish to blackish; vein M_2 rudimentary 25
- In ♂, "antennae 2+28, scape dark brownish, comb-like prolongation orange yellow except on tip tinged with a little brownish" and in ♀, "antennae 1+29, similar to ♂ except on apical 4 scalps tinged with yellowish, and on basal 3 scalps tinged with light brownish orange"; front shining black, occiput dull black, proboscis and palpus orange yellow; thorax orange yellowish but upper margin of mesopleura with a small brownish spot and in ♀, mesonotum with 3 indistinct light brownish stripes; leg orange but hind tibia except for apical part black, and segments 3-5 of fore and mid tarsi and segments 2-5 of hind tarsi tinged with brown; wing "light yellowish, darker at stigmatic portion on anterior margin, apical margin, all hindal margin left yellowish spots"; abdomen yellowish orange, but anterior margin of terga 3-5 narrowly blackish and in ♀, tergum 1 dark orange, tergum 2 orange, anterior margin of terga 3-6 narrowly blackish and ovipositor brownish orange; body ♂ 11 mm, ♀ 12.5 in length (2 ♂♂, 3 ♀♀; Tienmushan, Chekiang Province, E. China) **orientalis** Ouchi, 1938
- 25(24). Mesopleura with dark brownish to blackish part and hind femur or hind tibia partially infuscated with dark brownish to blackish 26
- Pleura and leg entirely yellowish brown 27
- 26(25). Pleura and scutellum reddish yellow but *upper part* of mesopleura blackish brown; mesonotum shining reddish yellow with 3 indistinct brown stripes; leg reddish yellow but "an der Unterseite des Hinterschenkels in zweiten Drittel ein dunkler Wirch"; antenna 2+21 segmented, reddish yellow but distal 1/2 blackish brown although lower processes all yellow; head shining black, palpus and proboscis reddish yellow; wing hyaline; in abdomen, dorsum shining reddish yellow but *anterior* border of each segment black and venter yellow; body about 9 mm and wing 8 in length (1 ♀; Simeulue I., Sumatra) **omissinervis** de Meijere, 1915
- Thorax yellowish brown but *posterior* 1/2 of mesopleura dark brownish to blackish and mesonotum with 2 narrow blackish stripes; leg yellowish brown, but hind tibia except knee and apex blackish; in antenna, which is 2+? (probably 2+17 or nearly so) segmented, 1st 2 segments yellowish brown and flagellum dark brownish but segments 1-2 and lower processes on segments 1-11 (or 1-12) yellowish brown; head shining black, palpus and proboscis yellowish brown; haltere yellowish brown; wing faintly tinged with dark brown although 2nd submarginal cell, and apex of each of costal-, subcostal-, 1st submarginal-, and 1st posterior cell more infuscated; vein R_3 ending on R_{1+2} before wing margin; abdomen yellowish brown but base of tergum 1 and *apex* of each of terga 2-4 with narrow blackish band which does not extend to sides of segment; body (without antenna and ovipositor) 8 mm and wing 9 in length (1 ♀; New Britain) **tenuiculus***
- 27(25). Thorax yellowish brown, mesonotum with 2 narrow blackish stripes; head shining chestnut brown or shining blackish, palpus and proboscis yellowish brown; antenna 2+16-17 segmented, 1st 2 segments yellowish brown, flagellum dark brownish but segments 1-3 and lower processes on segments 1-11 (or 1-12) yellowish brown; haltere and leg yellowish brown; wing and abdomen as in *tenuiculus*; body (without antenna and ovipositor) 6 mm, wing 7 in length (1 ♀; New Guinea) **tenuis***
- Thorax yellowish brown, mesonotum with 2 narrow black stripes and *with 1 black spot on each side in front*; head shining black; antenna 2+ nearly 20 segmented, yellowish brown but distal about 1/2 black; haltere and leg yellowish brown; wing "slightly cinereous"; abdomen yellowish brown, "with a slender black band at the base"; body 6.4 mm in length (1 ♀; Batjan, Molucca Is.) **bilineus** (Wakler, 1861)

- 28 (3). Wing not as below 29
 Wing dark smoky brown with 7 well defined hyaline spots, "die in der vorderen und hinteren Radial-, zweiten vorderen Discoidal-, vorderen Postical-, Basal-, Basal-Discoidal- und hinteren Posticalzelle liegen, ausserdem ist der Flügellappen am Rande auch hyalin"; head black, front shining, proboscis dark brown and palpus pale brown; antenna 2+33 segmented and dull black; mesonotum shining dark brown with 4 indistinct blackish stripes; humeral callus brownish yellow; pleura yellowish brown but its antero-upper part dark brown; scutellum blackish brown; haltere yellowish brown with knob gray; fore leg brownish yellow but tarsus somewhat darkened, mid leg concolorous with fore leg but ventral basal 1/2 of femur brown, and hind leg dark brown; abdomen shining dark "pechbrown", with broad black band on posterior border of each tergum; body (without antenna and ovipositor) 8.7 mm, wing 9.7, antenna 4.2 in length (1 ♀; Janano Taiko, Taiwan) **fenestratus** Kertész, 1914
- 29(28). Abdominal tergum 2 entirely or largely yellowish brown, although in *solivagus* it has a broad median blackish band 30
 Abdomen entirely or largely dark brownish to blackish or entirely (at least almost entirely) brown; in some species, namely, *nimbosus* and *unicinctus*, tergum 2 with pale brownish, yellowish, or dark reddish basal band 35
- 30(29). In abdomen, tergum 2 with a median blackish band and segment 3 entirely blackish 31
 Abdominal segments 2 and 3 largely yellowish or yellowish brown 32
- 31(30). Abdomen shining blackish with following pale yellowish parts: segment 2 except a median band, posterior band of segment 3 and that of tergum 4; head shining black, palpus and proboscis dark brownish (although apical part of former yellowish brown); antenna 2+36-37 segmented, shining blackish but in lower processes of flagellum segment 1 and basal 1/2 of segments 2-5 yellowish brown; thorax shining black but humeral callus and upper margin of mesopleura yellowish brown; haltere yellowish white; leg dark brownish to blackish but in fore and mid legs basitarsus except apical part and tibia and in hind leg apical part of tibia pale yellowish brown; wing rather strongly tinged with dark brown; body (without antenna) 11.5 mm and wing 9 in length (1 ♂; Thailand) **solivagus***
 Abdomen dark brownish, but tergum 2 (excepting a band at transverse row of sensory pits, a median stripe from band just mentioned to posterior border of segment, and lateral margin of segment), sternum 2 (excepting posterior border of segment), and posterior border of tergum 1 yellowish brown; head shining black, front with a chestnut-brown tinge; palpus and proboscis dark brownish; antenna 2+37 segmented, dark brownish but segment 2 and lower processes on segments 3-4 (=segments 1-2 of flagellum) and lower processes excepting bases and apices on segments 5-9 (or 10 or more) yellowish brown; thorax dark brownish, humeral callus and upper margin of mesopleura yellowish brown; haltere yellowish brown; leg (fore leg is missing) yellowish brown, but coxa except apex and femur except base and apex dark brownish; wing rather strongly tinged with dark brown, stigma and area above stigma slightly darker while base and posterior border of wing somewhat paler; body (without antenna and ovipositor) 13 mm and wing 12 in length (1 ♀; Los Baños, Philippines) **boarius***
- 32(30). Abdomen partially dark brownish to blackish 33
 Abdomen, except genitalia and ovipositor or intersegmental membranes, entirely yellowish brown to brownish; see couplet 14 **rusticus***
- 33(32). Pleura at least largely dark brownish to blackish 34

- Pleura entirely yellowish brown; see couplet 15..... **opiparus***
- 34(33). Abdomen yellowish brown, but segments 1 and 5-7, genitalia, sternum 4 and lateral margins of terga 2-4 dark brownish; head shining black, palpus and proboscis brownish to dark brownish; antenna 2+24 segmented, segments 1-2 brownish to dark brownish, flagellum yellowish brown but distal 16-17 segments except lower processes dark brownish; thorax dark brownish with a brownish tinge but humeral callus and upper margin of mesopleura pale brownish, mesonotum with a pair of blackish stripes; haltere yellowish brown; leg yellowish brown, but coxa and femur dark brownish; wing tinged with brown; body (without antenna) 10 mm and wing 8 in length (1 ♂; N of Kalabakan, N. Borneo)..... **endymion***
- Abdomen black, but segments 1-3 except borders of each tergum mainly yellow and center of tergum 4 more or less yellow; head shining black, palpus and proboscis bright yellow; antenna 2+? segmented, 1st 2 segments black and 1st segment of flagellum blackish brown but lower process bright yellow (distal part of antenna is missing); thorax entirely shining black, but humeral callus bright yellow; haltere bright yellow; leg bright yellow, hind coxa black; wing "gray, with a hardly perceptible darkening from costa partly across the wing, and again towards the tip"; body 8.5 mm in length (1 ♀; Kandy, Ceylon)
- **bicolor** Brunetti, 1912
- 35(29). Wing not as below 36
- Wing strongly tinged with yellowish brown but area distad from line running from apex of subcosta through r-m crossvein distinctly darkened; head black (front shining), palpus and proboscis dark brownish but apical portion of latter yellowish brown; antenna 2+16 segmented, 1st 2 segments shining black and flagellum dark brownish but apex of segment 2 and base of segment 3 (=basal segment of flagellum) yellowish brown; thorax dark brownish to blackish but humeral callus and upper margin of mesopleura pale brownish; haltere yellowish brown; leg dark brownish to blackish, but in basal more than 1/2 of tibia and of basitarsus, posterior surfaces of fore and mid legs and entire surface (except for knee) of hind leg whitish to pale brownish; abdomen dark brownish to blackish; body (without antenna and ovipositor) 9 mm and wing 8.5 in length (1 ♀; N of Kalabakan, N. Borneo) **bifidus***
- 36(35). Wing with a darker region behind stigma 37
- Wing not as above 39
- 37(36). Leg not as below; antenna 2+28-30 segmented, flagellum dark brownish (in *obataratus* basal parts of lower processes yellowish brown) 38
- Femur black but ventral surface of fore femur yellowish, tibia and tarsus whitish but apical 1/3 of hind tibia blackish brown; antenna 2+18 segmented, 1st 2 segments black and flagellum yellowish brown; head shining black, palpus black; thorax shining black, humeral callus and scutellum black; haltere yellowish; wing tinged with brown and with a large brown band in middle from costa to posterior border of discal cell; abdomen shining black; body about 10 mm and wing 7.5 in length (1 ♂; Kambaiti, NE Burma) **maculipennis** Frey, 1954
- 38(37). Leg black but "vorderen Kniee und Tarsen" reddish yellow; head shining black, palpus blackish brown; antenna 2+30 segmented, segment 1 blackish brown, segment 2 yellowish and flagellum dark brown; thorax shining black, but humeral callus and scutellum reddish brown; haltere yellowish; wing smoky gray, stigma and a region behind stigma brown; abdomen shining black; body 9 mm and wing 6.5 in length (1 ♂; Port Bange, Philippines)
- **robustus** Frey, 1954
- Leg dark brownish to blackish, but in tibia, and tarsal segments 1-2 of fore and mid legs dorsal surface and in femur of hind leg anterior surface and dorsobasal

- part whitish or pale brownish; head shining black, palpus and proboscis dark brownish; antenna 2+28 segmented, dark brownish but lower processes of flagellum with yellow-brown basal parts; thorax dark brownish to blackish but humeral callus and upper margin of mesopleura whitish or pale brownish; haltere whitish or pale brownish; wing very faintly tinged with brown, and stigma, apical part of costal cell and that of subcostal cell, and a band from stigma to base of 4th posterior cell dark brown; abdomen dark brownish to blackish (intersegmental membranes between sterna 1-2, 2-3, and 3-4 yellowish brown); body (without antenna) 8.5 mm and wing 7.5 in length (1 ♂; N of Kalabakan, N. Borneo)
.....**obatratus***
- 39(36). Coxa and femur entirely or largely dark brownish to blackish 40
Coxa and femur largely yellow or yellowish brown (in *galloisi* middle portion of hind femur black, in *tristis* coxa brown, and in *unicinctus* about basal 1/2 of femur black) 47
- 40(39). Leg not as below; number of antennal segments 2+20 or less 41
Coxa, trochanter, and femur shining black but apex of femur brownish; in fore leg, tibia and tarsus yellowish brown and in mid and hind legs, tibia dark brown and tarsus somewhat paler; antenna 1+37 segmented [antenna probably entirely black]; head shining black, labellum brown; thorax dull black, humeral callus gray; haltere gray; wing dark smoky brown; abdomen black and ovipositor brownish; body (without antenna and ovipositor) 13.5 mm, wing 13.2, and antenna 4.4 in length (1 ♀; Soekaranda, Sumatra) **nigrinus** Wandolleck, 1897
- 41(40). Both tibia and basitarsus entirely or partly whitish to pale brownish (in *pullus* hind tibia except apex and hind basitarsus dark brownish) 42
Either tibia or tarsus entirely or partly whitish to pale brownish 45
- 42(41). Antenna entirely dark brownish (this character may possibly be variable; see couplet 44 for caution's sake) 43
Basal parts of lower processes at least on some proximal flagellar segments yellowish brown (read couplet 43 by way of precaution) 44
- 43(42). Vein R_3 ending on costa; head shining black, palpus blackish brown; antenna 2+13 segmented and entirely blackish brown; last segment of flagellum $2 \times$ as long as preceding one; thorax shining black but humeral callus whitish; haltere yellowish white; femur black but in hind femur base and ventral part yellowish; tibia and basitarsus whitish but distal 1/2 of hind tibia blackish brown; tarsal segments 2-5 brown; wing evenly tinged with brownish; abdomen "glänzend schwarz auf rötlichen Grunde"; body 8 mm and wing 7.5 in length (1 ♀; St Thomas, Luzon, Philippines) **pauciarticulatus** Frey, 1954
Vein R_3 ending on R_{1+2} distinctly before wing margin; head and its appendages, thorax, leg, and abdomen castaneous but humeral callus, haltere, tibia except less than apical 1/2 of hind leg, tarsus except apical portion, and hind femur except approximately apical 1/2 yellowish brown; antenna 2+15 segmented; wing faintly tinged with dark brown; body (without antenna and ovipositor) 7.5 mm and wing 7.5 in length (1 ♀; Ceylon) **spissus***
- 44(42). Last segment of antennal flagellum flattened dorsoventrally; leg dark brownish but basitarsus (except apex of hind basitarsus), fore tibia (except ventral part), dorso-posterior part of mid tibia, hind tibia (except apical part), and base of hind femur (which is sometimes indistinct) whitish to pale brownish; head shining black, palpus and proboscis dark brownish to blackish but apical portion of latter yellowish brown; antenna 2+16-17 segmented, dark brownish but lower processes of flagellum with yellowish brown to brownish basal parts which are sometimes restricted to some proximal segments; thorax dark brownish to blackish, but

- humeral callus and scutellum (except basal part) pale brownish; haltere pale yellowish brown; wing tinged with brown to dark brown; *vein R₃ ending on R₁₊₂ before wing margin*; abdomen dark brownish to blackish; body (without antenna and ovipositor) ♂ 6-7 mm, ♀ 7.5, and wing ♂ 5-6, ♀ 7 in length (2 ♂♂, 1 ♀; N. Borneo) **flabellum***
- Last segment of antennal flagellum flattened laterally as usual; leg dark brownish but in fore and mid legs tibia, basitarsus, and apex of femur and in hind leg apex of tibia yellowish brown; head shining blackish, palpus and proboscis yellowish brown; antenna 2+19 segmented, dark brownish but basal parts of lower processes on flagellar segments 1-3 (or 1-4) yellowish brown; thorax brownish to dark brownish but humeral and posterior calli, upper 1/2 of pteropleura, and haltere yellowish brown; mesonotum with darker stripes and spots; wing faintly tinged with dark brown; *vein R₃ ending on costa*; abdomen dark brownish; body (without antenna) 7 mm and wing 6 in length (1 ♂; S. India)..... **pullus***
- 45(41). Wing faintly infuscated or nearly hyaline 46
 Wing strongly tinged with dark brown and stigma slightly darker; head shining black, palpus and proboscis dark brownish to blackish; antenna 2+19 segmented, 1st 2 segments dark brownish to blackish and flagellum dark brownish but entire surface of segment 1 and lower processes on segments 2-3 paler; thorax dark brownish to blackish but humeral callus and upper margin of mesopleura pale brownish; haltere whitish to pale brownish; leg dark brownish but tibia whitish to pale brownish; abdomen dark brownish to blackish but sternum 1 (except apical part), anterior part of sternum 2 and that of tergum 2 pale brownish; body (without antenna and ovipositor) and wing 6 mm in length (1 ♀; N of Kalabakan, N. Borneo) **nimbosus***
- 46(45). Antenna black, and in lower processes of flagellum median ones nearly 1/2 as long as entire flagellum; antenna 2+15 segmented; leg "black; base of hind femora, anterior knees, and 1st 2 or 3 tarsal joints whitish, the tips of the latter blackened, especially the hind metatarsus"; head black, front and face shining; palpus and proboscis black; thorax "shining black, the shoulders blackish yellow obscurely"; haltere "white with stem brownish"; wing "gray, slightly darker along fore border, with a large, undefined stigmatic darkening" [*vein R₃ ending on R₁₊₂ before wing margin*]; abdomen shining black; body (without antenna) 6 mm in length (1 ♂; Pattipola, Ceylon) **aterrimus** Senior-White, 1924
- Antenna in ♂ entirely dark brownish, and in lower processes of flagellum median ones about 1/4 as long as entire flagellum; antenna in ♂ 2+18 and in ♀ 2+? segmented; leg in ♂ (fore leg, mid tarsus, and last 2 segments of hind tarsus are missing) dark brownish and in ♀ dark brownish but dorsal surface of tibia except apical part pale yellowish brown or whitish; head shining dark brownish, palpus and proboscis dark brownish; thorax brownish but humeral callus and upper margin of pleura pale yellowish brown or whitish; haltere dark brownish; wing faintly tinged with dark brown; abdomen shining dark brownish; body (without antenna and ovipositor) ♂ 5.5 mm, ♀ 7 and wing ♂ 5, ♀ 7 in length (1 ♂, 1 ♀; Java) **nigellus***
- 47(39). Leg yellowish but at least hind tibia or hind tarsus entirely or partially dark brownish to blackish; wing nearly hyaline or tinged with yellowish 48
 Leg entirely yellowish brown to brownish; wing rather strongly tinged with dark brown; head castaneous, palpus and proboscis brownish; antenna 2+26 segmented in ♀ (in 4 ♂♂, 3 ♀♀ at hand apical part of antenna broken off) and entirely dark brownish; thorax castaneous, humeral callus and upper 1/2 of pteropleura

- yellowish brown to pale brownish; abdomen castaneous; body (without antenna and ovipositor) ♂ 6-7.5 mm, ♀ 6-8.5 and wing ♂ 6-7, ♀ 6.5-8.5 in length (4 ♂♂, 4 ♀♀; Kotosho, Taiwan) *kotoshensis**
- 48(47). Hind tibia at least partially dark brownish to blackish 49
 Leg yellowish, but coxa brown and tarsus black; antenna 2+32-33 segmented; head, thorax, and abdomen black; haltere yellowish but knob darkened; wing evenly suffused with gray; body 6.5-7 mm in length (1 ♂; Spain) (after Lindner 1925: 3) *tristis* Loew, 1869
- 49(48). Leg orange yellow but trochanter, ca. basal 1/2 of femur, and entire surface of hind tibia black; head black (front shining), palpus and proboscis orange; antenna 2+20-21 segmented, 1st 2 segments "blackish above, orange below" and flagellum "with upper side and tips of rays [= lower processes] black, the intermediate

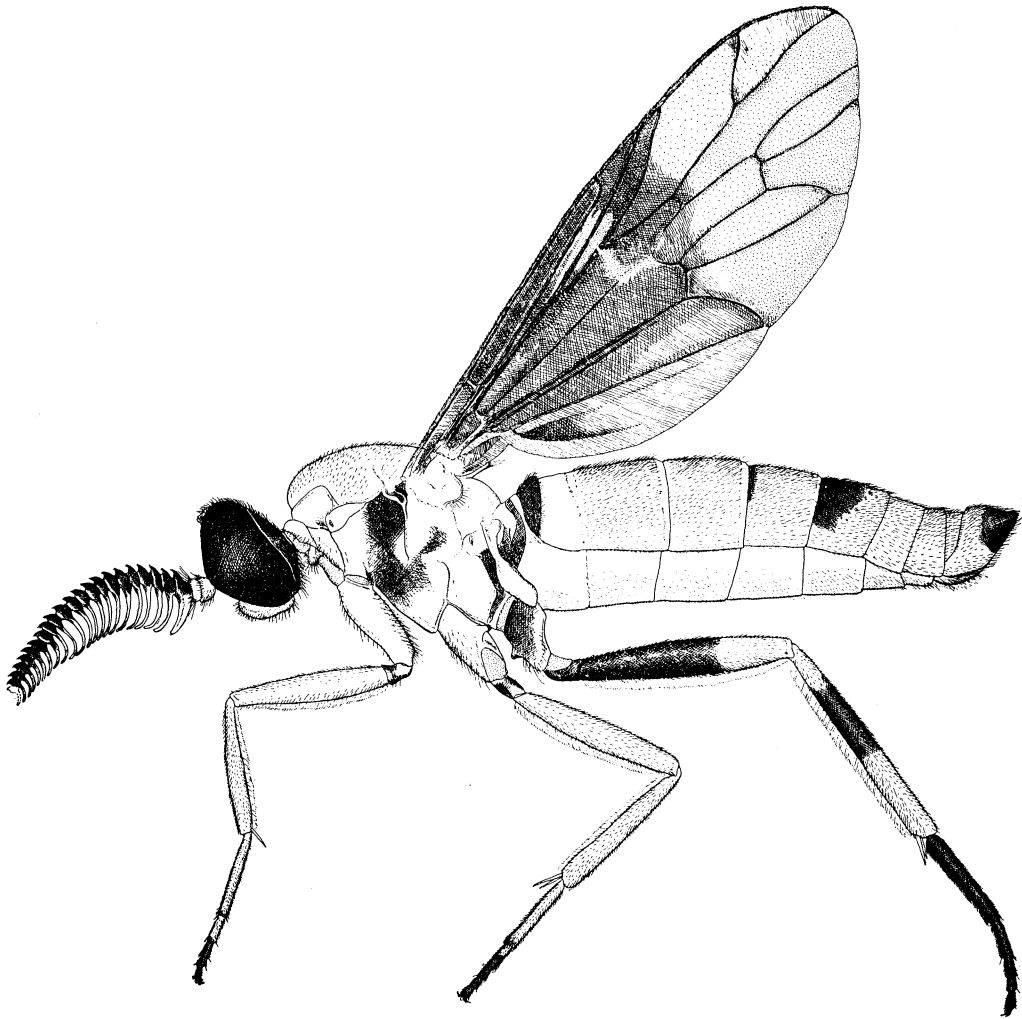


Fig. 1. *Rachicerus varius* n. sp., ♂.

part of rays orange yellow"; thorax shining black but humeral callus and mesopleura dull shining yellowish; haltere yellowish; wing "yellowish gray, vitreous, stigmatic region a little yellowish brown, a slight infuscation at wing-tip" [vein R_3 ending on R_{1+2} before wing margin]; abdomen black, but in tergum 2, area before a row of sensory pits and in sternum 2, main part yellowish; body 8 mm in length (1 ♀; Darjeeling, India) **unicinctus** Brunetti, 1920

Leg yellowish brown but in hind leg tibia except apical part dark brownish to blackish and femur except base, apex, and ventral part, and basitarsus at base with a dark brownish tinge; head shining black, palpus brownish to dark brownish and proboscis yellowish brown to brownish; antenna 2+18-20 in ♂ and 2+21 in ♀ segmented, 1st 2 segments dark brownish to blackish and shining, flagellum dark brownish but lower processes yellowish brown; thorax shining black; haltere yellowish brown; wing faintly tinged with dark brown; abdomen shining dark brownish to blackish (anterior part of tergum 1 may have a brownish tinge and that of sternum 2 are sometimes yellowish brown); body (without antenna and ovipositor) ♂ 7 mm, ♀ 8.5 and wing ♂ 6.5, ♀ 9 in length (2 ♂♂, 1 ♀; Japan) (further description is given in p. 462) **galloisi** Séguy, 1948

1. **Rachicercus bifidus** Nagatomi, new species Fig. 2-3.

One ♀ from Sabah (N. Borneo); dark brownish to blackish; leg partly whitish to pale brownish; wing strongly tinged with yellowish brown but nearly apical 1/2 distinctly darkened; antenna 2+16 segmented. See couplet 35 of the key. This species is peculiar in the coloration of wing.

♀. **Head:** Black, front shining; 1st 2 antennal segments shining black; flagellum of antenna, palpus and proboscis dark brownish; in antenna, apex of segment 2 and base of segment 3 (=basal segment of flagellum) and in proboscis, apical portion yellowish brown; front with numerous longitudinal grooves which run at opposite sides of ocellar triangle (middle one extends to median ocellus); eye without a shining incision; upper part of front, ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, and 1st 2 antennal segments with black hairs which may be pale on ocellar triangle; width of front at broadest point somewhat longer than (1.2 ×) distance from antenna to median ocellus, and 1.35 width of front at median ocellus which is 2.9 width of ocellar triangle; in antenna, whose segmental number is 2+16 and whose total length is 2.5 distance from antenna to median ocellus, segment 1, 0.6 as wide as long, longest ones of lower processes 1.8 as long as width of segment 2 (of antenna), and last segment of flagellum 1.8 as long as wide.

Thorax: Dark brownish to blackish but humeral callus and upper margin of mesopleura pale brownish, and posterior callus and pleura especially upper 1/2 of pteropleura with a pale brownish tinge; mesonotum and scutellum pale pilose but anterior and lateral margins of former with black hairs; pro-, postero-upper and posterior parts of meso-, meta-, and pteropleura below posterior spiracle with black hairs which are short and inconspicuous on last mentioned one; haltere yellowish brown.

Leg: Dark brownish to blackish, but in more than basal 1/2 of tibia and of basitarsus, posterior surfaces of fore and mid legs and entire surface (except knee) of hind leg whitish to pale brownish; trochanter, apices of mid and hind coxae, apices of fore and mid femora, base of hind femur, and apices of posterior surfaces of fore and mid tibiae pale brownish to yellowish brown; fore coxa with black pile and mid and hind coxae with pale pile, femur with black pile which becomes pale on ventral surface; tibia intermixed with pale and black pile; in hind tibia, terminal spur distinctly longer than width of tibia (1.4 ×); it is uncertain whether or not ventral process on hind coxa is present; relative length of segments of fore leg (except

coxa and trochanter) 146-154-100-29-21-15-30, of mid leg 151-154-101-33-21-13-29, of hind leg 189-217-110-43-22-16-28.

Wing: Membrane strongly tinged with yellowish brown but area distad from line running from apex of subcosta through r-m crossvein distinctly darkened; veins yellowish brown but those on darkened area dark brown; thickening of costa ending just beyond apex of R_5 .

Abdomen: Dark brownish to blackish; abdomen above and below clothed with, short recumbent black pile which is erect on ovipositor, but tergum 1 with longer, erect pile in addition to dense, very short, recumbent one and sternum 1 bare.

Length: Body (without antenna and ovipositor) 9 mm; wing 8.5; fore basitarsus 1.5.

♂. Unknown.

DISTRIBUTION: N. Borneo.

Holotype ♀ (BISHOP 6593), N of Kalabakan, 30.X.1962, K. J. Kuncheria.

2. *Rachicerus boarius* Nagatomi, new species Fig. 4-6.

One ♀ from Philippines; dark brownish to blackish but abdominal segment 2 largely and tibia and tarsus (fore leg lacking) almost entirely yellowish brown; wing rather strongly tinged with dark brown; antenna 2+37 segmented. See couplet 31 of the key. This species is similar somewhat to *endymion* n. sp. and *bicolor* Brunetti in the coloration of thorax and of abdomen but may be separable from both by having the abdominal segment 3 almost entirely dark brownish to blackish. Among the species known from the Philippines this species is peculiar in the coloration of abdomen and of leg.

♀. Head: Shining black (face dull), front with a chestnut-brown tinge; antenna, palpus, and proboscis dark brownish but in antenna, (1) segment 2, (2) lower processes on segments 3-4 (segment 3 means basal segment of flagellum), and (3) lower processes except bases and apices (from a direct lateral view) on segments 5-9 (or 10 or more) yellowish brown (in (3), yellow-brown areas are gradually smaller distally); proboscis and 1st antennal segment may have a brownish tinge; front with a pair of longitudinal grooves (which run at opposite sides of ocellar triangle) and some short ones; ocellar triangle, vertex, occiput, and cheeks pale pilose and palpus and proboscis black haired; antennal segments 1-2 intermixed with pale and black hairs; width of front at broadest point equal to distance from antenna to median ocellus and 1.35 width of front at median ocellus which is 2.5 width of ocellar triangle; antenna 2+37 segmented, its total length 4.4 distance from antenna to median ocellus, segment 1 about as wide as long ($0.9 \times$), longest ones of lower processes 1.5 as long as width of segment 2, and last segment of flagellum somewhat longer than wide ($1.2 \times$).

Thorax: Dark brownish, but humeral callus and upper margin of mesopleura yellowish brown and lateral borders of mesonotum, posterior callus, pleura especially meta- and upper 1/2 of pteropleura with a yellow-brown tinge; mesonotum, scutellum, pro-, antero-lower, upper and posterior part of meso-, sterno- (near middle), and metapleura with pale pile which is longer on pro- and metapleura; haltere yellowish brown (apex with a dark brownish tinge).

Leg (fore leg except coxa and trochanter is lacking): Yellowish brown, but coxa except apex and femur except base and apex dark brownish (yellow-brown basal part of hind femur is larger than that of mid femur but is apparently less than 1/2 as long as dark brownish part) and tarsus with a dark brownish tinge; coxa, femur, and tibia with short, pale pile which becomes black on posterior surface (except base) of hind tibia and on ventrodiscal part of mid tibia; it is uncertain whether or not ventral process on hind coxa is present; relative length of segments of mid leg 155-151-80-26-16-11-20, of hind leg 201-221-98-37-20-12-21.

Wing: Membrane rather strongly tinged with dark brown, stigma and area above stigma

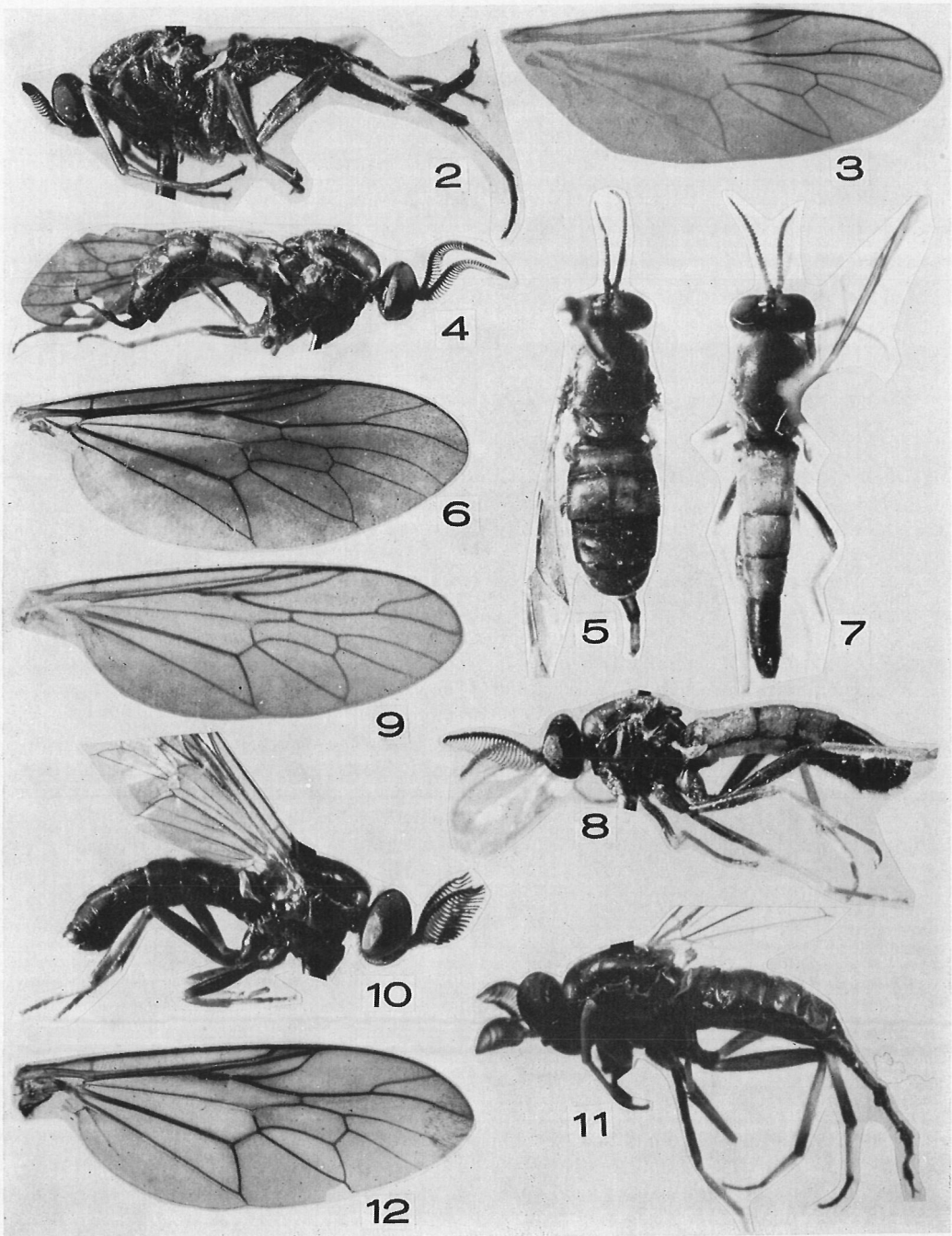


Fig. 2-3. *Rachicerus bifidus* n. sp., ♀. Fig. 4-6. *R. boarius* n. sp., ♀. Fig. 7-9. *R. endymion* n. sp., ♂. Fig. 10-12. *R. flabellum* n. sp. (10: ♂; 11-12: ♀).

slightly darker while base and posterior border of wing somewhat paler; veins dark brown; thickening of costa becomes very narrow beyond apex of R_4 and ends beyond apex of M_2 .

Abdomen: Dark brownish, but segment 2 (except some regions) and posterior border of tergum 1 yellowish brown; in tergum 2 a band at transverse row of sensory pits, a median stripe from band just mentioned to posterior margin of segment, and lateral margins of segment and in sternum 2 posterior border of segment dark brownish; sternum 2 especially near posterior border with a dark brownish tinge; abdomen above and below clothed with pale pile which is longer on sides of dorsum.

Length: Body (without antenna and ovipositor) 13 mm; wing 12.

♂. Unknown.

DISTRIBUTION: Philippines.

Holotype ♀ (BISHOP 6594), Los Baños, Luzon, 7.VII.1917, F. X. Williams.

3. *Rachicerus endymion* Nagatomi, new species Fig. 7-9.

One ♂ from N. Borneo; dark brownish to blackish but abdominal segments 2-3 and tergum 4, and tibia and tarsus yellowish brown; antennal flagellum largely yellowish brown; wing tinged with brown; antenna 2+24 segmented. See couplet 34 of the key. This species is similar to *bicolor* Brunetti in the coloration of thorax and of abdomen, but may differ from latter in its marking of leg as well as the details of the coloration of abdomen as shown in the key. Among the species known from Borneo this species is peculiar in the coloration of abdomen.

♂. Head: Shining black; palpus dark brownish to blackish, proboscis and 1st 2 antennal segments brownish to dark brownish; antennal flagellum, which is 24 segmented, yellowish brown but segments 7 (or 8)-24 (except lower processes) dark brownish; front with 2 pairs of longitudinal grooves which run at opposite sides of ocellar triangle; ocellar triangle, vertex, occiput and cheeks pale yellowish pilose, and (1) palpus, (2) proboscis, (3) antennal segments 1-2 with black hairs which are longer on (3); width of front at broadest point equal to distance from antenna to median ocellus and 1.5 width of front at median ocellus which is $2 \times$ width of ocellar triangle; in antenna, whose total length is $4 \times$ distance from antenna to median ocellus, segment 1, 1.5 as wide as long, longest ones of lower processes 2.7 as long as width of segment 2, and last segment of flagellum 1.6 as long as wide.

Thorax: Dark brownish, but humeral callus and upper margin of mesopleura pale brownish and lower part of pteropleura (between mid and hind coxae) with a yellowish brown tinge; a pair of longitudinal blackish stripes present on mesonotum and area between them darker than region (which has a brownish tinge) between stripe and side of mesonotum; mesonotum and scutellum short pale yellowish pilose; pro-, and antero-lower, postero-upper and posterior parts of mesopleura with pale yellowish pile which is longer on propleura; metapleura intermixed with pale yellowish and black hairs; haltere yellowish brown.

Leg: Yellowish brown, but femur except knee and extreme base, and coxa dark brownish although mid and hind coxae paler than femur and fore coxa; tarsus somewhat darker than tibia; coxa pale pilose and femur with black hairs which become pale on ventral surface; tibia with pale yellowish hairs; hind coxa with a ventral process; relative length of segments of fore leg 169-167-100-29-20-15-25, of mid leg 195-182-100-35-22-15-24, of hind leg 249-262-120-47-24-16-25.

Wing: Membrane tinged with brown; stigma not marked; veins dark brown; thickening of costa ending beyond apex of M_2 .

Abdomen: Yellowish brown, with following dark brownish parts: segments 1 and 5-7, genitalia, sternum 4, and lateral margins of terga 2-4; in each of sternum 4 and 5 basal part with a brownish tinge; entire sternum 2 rather whitish; abdomen above and below clothed with black

hairs which do not become long on sides of dorsum and which become pale on tergum 9 and are intermixed with pale pile on tergum 2; sternum 1 practically bare.

Length: Body (without antenna) 10 mm; wing 8; fore basitarsus 1.1.

♀. Unknown.

DISTRIBUTION: Sabah (N. Borneo).

Holotype ♂ (BISHOP 6595), N of Kalabakan, 27.X.1962, Y. Hirashima.

4. *Rachicercus flabellum* Nagatomi, new species Fig. 10-12.

Two ♂♂ and 1 ♀ from N. Borneo; dark brownish to blackish but leg partly whitish to pale brownish and in ♂ lower processes of antennal flagellum partly yellowish brown; wing tinged with brown to dark brown; antenna 2+16-17 segmented; last segment of flagellum flattened dorsoventrally; vein R_3 ending on R_{1+2} before wing margin. See couplet 44 of the key. This species appears to be most closely related to *pauciarticulatus* Frey but may be distinguished from the latter by the number of antennal segments. Among the species known from Borneo this species is peculiar in the shape of the last segment of antennal flagellum.

♂. Head: Shining black; palpus, proboscis, and antennal segments 1-2 dark brownish to blackish, but apical portion of proboscis and inner tip of antennal segment 2 yellowish brown; antennal flagellum dark brownish but lower processes with yellowish brown to brownish parts which occupy basal about 1/2 and is sometimes restricted to some proximal segments; front with numerous longitudinal grooves; eye without a shining incision; upper portion of front, ocellar triangle, and vertex with pale pile; occiput, cheeks, palpus, proboscis, and antennal segments 1-2 with black hairs which are sometimes pale on occiput; total width of head 6-7 × width of face at lowest portion from a direct frontal view; width of front at broadest point about equal to (1.1-1.2 ×) distance from antenna to median ocellus, and 1.3 width of front at median ocellus which is 3.2-3.5 width of ocellar triangle; in antenna, whose segmental number is 2+16-17 and whose total length is 2.5 distance from antenna to median ocellus, segment 1 narrower than long (0.6-0.7×), longest ones of lower processes 3.3-3.6 as long as width of segment 2 (of antenna), and last segment of flagellum, which is flattened dorsoventrally, 3.8-4.5 as long as wide (from a dorsal view).

Thorax: Dark brownish to blackish and shining, but humeral callus, upper margin of mesopleura, and scutellum (except basal part) pale brownish, and upper 1/2 of pteropleura and posterior callus with a pale brownish tinge; mesonotum and scutellum with pale pile which is longer on latter; pro-, antero-lower, upper and posterior parts of meso-, and metapleura with blackish hairs which are long on pro- and metapleura and are sometimes pale in color on mesopleura; haltere pale yellowish brown.

Leg: Dark brownish, but following parts whitish to pale brownish: in fore leg tibia and basitarsus (in both of which ventral surface is somewhat darkened) and knee of femur, in mid leg basitarsus, posterior surface of tibia, and knee of femur, and in hind leg base of femur, basal 1/2 or somewhat more of tibia, and basitarsus (except apex); hairs on coxa black, and those on femur and tibia chiefly pale in color; hind coxa without ventral process; relative length of segments of fore leg 206-203-100-28-19-16-31, of mid leg ?, of hind leg 241-275-119-44-25-19-31.

Wing: Membrane tinged with brown to dark brown; stigma not marked; veins brown to dark brown; thickening of costa ending at apex of R_5 .

Abdomen: Dark brownish to blackish; dorsum pale pilose and tergum 1 with short, recumbent pale pile in addition to longer one which becomes blackish on sides; venter with black pile (sternum 1 bare).

Length: Body (without antenna) 6-7 mm; wing 5-6; fore basitarsus 0.65 (in specimen whose body is 6 mm and wing 5).

♀. Similar to ♂ except as follows: Head: Antennal flagellum entirely blackish, although basal portions of lower processes on segments 1-3 with a brownish tinge; structure of head almost fits description of ♂ (in specimen at hand total width of head $5.8 \times$ width of face at lowest portion from a direct frontal view, width of front at broadest point $1.2 \times$ distance from antenna to median ocellus and $1.4 \times$ width of front at median ocellus which is $3.0 \times$ width of ocellar triangle, antenna 2+17 segmented in right antenna and 2+16 in the left, its total length $2.7 \times$ distance from antenna to median ocellus, longest ones of lower processes $3.2 \times$ width of segment 2 (of antenna), and length of last segment of flagellum $3.0 \times$ (in right antenna) or $3.8 \times$ (in the left) its width from a dorsal view).

Leg: In hind leg pale brownish basal part of femur and dark brownish apical part of tibia become narrower than in ♂ (in hind tibia dark brownish apical part from an anterior view about 1/4 and that from a posterior view about 1/2 as long as pale brownish basal part respectively; relative length of segments of fore leg 180-186-100-29-18-12-27, of mid leg 186-194-96-31-18-12-25, of hind leg 235-275-118-39-23-14-27.

Abdomen: Pile on sides of terga 2-5 black in color; in tergum 1 black-haired area is larger than in ♂ and short, recumbent pile appears to be black on sides.

Length: Body (without antenna and ovipositor) 7.5 mm; wing 7; fore basitarsus 1.0.

DISTRIBUTION: Sabah (N. Borneo).

Holotype ♂ (BISHOP 6596), N of Kalabakan, 15.X.1962, K. J. Kuncheria.

Paratypes: 1 ♂, Kalabakan R., Tawau, 9-18.XI.1958, T. C. Maa (BISHOP); 1 ♀, N of Kalabakan, 18.XI.1962, Kuncheria (BISHOP).

5. *Rachicerus fluidus* Nagatomi, new species Fig. 13-14.

One ♂ from New Guinea; yellowish brown but head blackish and abdomen (except base and terminalia) and apical part of antennal flagellum dark brownish; wing faintly tinged with dark brown; antenna 2+14 segmented; vein M_2 entirely lacking and vein R_3 ending on R_{1+2} before wing margin. See couplet 5 of the key. This species is distinguished from other species, in which the thorax is yellowish brown and the abdomen is largely dark brownish, by having the segmental number small and the wing without the stigma or a median band. This species is easily separated from *tenuis* n. sp. of New Guinea by having the abdomen largely dark brownish.

♂. Head: Shining dark brownish to blackish, but proboscis, palpus except apical portion, and antenna except apical portion of flagellum (which is dark brownish) yellowish brown; in antennal flagellum, which is 14-segmented, dark brownish parts are as follows: in part other than lower processes segment 4 (or 5) -14 (in segments 4-5 ventral surface yellowish brown) and in lower processes segments 11-13 and apical parts of segments 3-10 which become gradually smaller in area proximally; front appears to have numerous longitudinal grooves; eye without a shining incision; ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, and antennal segments 1-2 pale yellowish pilose; total width of head about $4 \times$ width of face at lowest portion from a direct frontal view; width of front at broadest point somewhat longer than ($1.15 \times$) distance from antenna to median ocellus and $1.5 \times$ width of front at median ocellus which is $2.3 \times$ width of ocellar triangle; antenna 3.4 distance from antenna to median ocellus, segment 1, 1.6 as wide as long, longest ones of lower processes $2.7 \times$ width of segment 2 (of antenna), and last segment of flagellum $2.1 \times$ as long as wide.

Thorax: Yellowish brown (mesonotum may have 3 indistinct rather broad dark brownish

longitudinal stripes, of which lateral ones may be broadly interrupted in middle); mesonotum, scutellum, pro-, antero-lower and upper parts of meso-, and metapleura with pale yellowish pile which is longer on pro- and metapleura; haltere yellowish brown.

Leg: Yellowish brown; last 2 segments of tarsus slightly infuscated; pile on leg pale yellowish; hind coxa with a ventral process; relative length of segments of fore leg 157-275-100-29-18-14-21, of mid leg 186-189-89-32-18-13-21, of hind leg 225-268-104-46-21-14-21.

Wing: Membrane faintly tinged with dark brown; stigma not marked; veins dark brown; vein M_2 lacking and vein R_3 ending on R_{1+2} before wing margin; thickening of costa ending beyond apex of M_1

Abdomen: Dark brownish, but segments 1-2 and genitalia yellowish brown and segment 3 with a yellowish brown tinge; sterna 1-3, sides of terga 1-3, and genitalia pale yellowish pilose and rest of abdomen black haired.

Length: Body (without antenna) and wing 4 mm; fore basitarsus 0.57.

♀. Unknown.

DISTRIBUTION: NE New Guinea.

Holotype ♂ (BISHOP 6597), Wau, Morobe District, 14.I.1963, J. Sedlacek.

6. *Rachicercus guttatus* Nagatomi, new species Fig. 15-16.

Two ♀♀ from W. Java; yellowish brown, but head except its appendages, 2 stripes on mesonotum, several parts of pleura, those of abdomen and those of leg dark brownish to blackish; antennal flagellum except lower processes largely dark brownish; wing tinged with brown; antenna 2+20 segmented; see couplet 23 of the key. This species is distinguished from *plagosus* n. sp. of India as shown in the key. Among the species known from Java this species is peculiar in the markings of its leg.

♀. **Head:** Dark brownish to blackish and shining; palpus, proboscis, and antenna yellowish brown, but antennal flagellum except lower processes, entire surface of segments 1-4 and that of last segment dark brownish; face more or less pale gray pollinose; front with numerous grooves, some of which extend to opposite sides of ocellar triangle; ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, and 1st 2 antennal segments yellow-brown pilose; width of front at broadest point about equal to distance from antenna to median ocellus (1.1 ×), and 1.4-1.6 width of front at median ocellus which is about 2 × width of ocellar triangle (2.1-2.3 ×); antenna 2+20 segmented, its total length 3.8 × distance from antenna to median ocellus, segment 1 about as wide as long, longest ones of lower processes somewhat more than width of segment 2 (of antenna) (1.25 ×), and last segment of flagellum about as long as wide (1.1 ×).

Thorax: Yellowish brown, with following dark brownish areas: 2 stripes on mesonotum, meso- (except anterior part), sterno- (except posterior part), lower part of ptero-, and metapleura (except posterior part); stripes on mesonotum begin opposite posterior portion of humeral callus and end opposite wing base; mesonotum, scutellum, pro-, meta- and upper and posterior margins of mesopleura with yellow-brown pile; haltere yellowish brown.

Leg: Yellowish brown; hind femur except apical part and hind tibia except ca. apical 1/2 dark brownish; trochanter, mid and hind coxae, bases of fore and mid femora with a dark brownish tinge (which may be present on basal portion of hind basitarsus and last 4 segments of hind tarsus); pile on coxa, femur and tibia yellowish brown; hind coxa with a mid ventral process; relative length of segments of fore leg 168 (166-169): 170 (168-172): 100: 31(30-32): 20 (20): 14 (12-15): 26 (24-28), of mid leg 197 (196-198): 199 (198-200): 97 (95-98): 32 (32): 21 (20-22): 15 (12-17): 22 (20-24), of hind leg 262 (261-262): 287 (284-289): 125 (117-132): 47

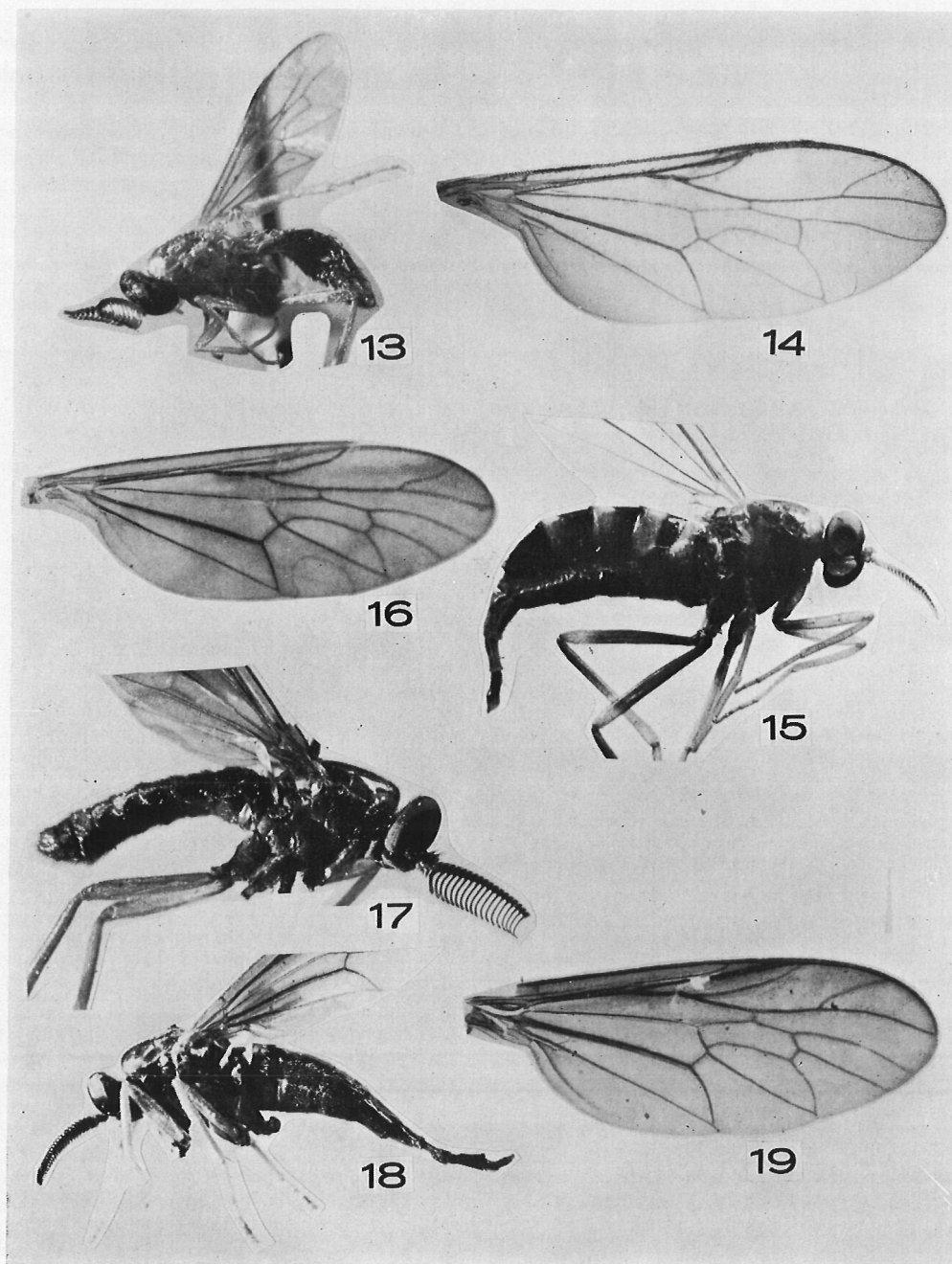


Fig. 13-14. *Rachicerus fluidus* n. sp., ♂. Fig. 15-16. *R. guttatus* n. sp., ♀. Fig. 17-19. *R. kotoshensis* n. sp. (17 & 19: ♂; 18: ♀).

(46-48): 24 (22-26): 15 (14-15): 24 (22-26), these were calculated from 2 specimens.

Wing: Membrane tinged with brown; stigma and 2nd submarginal cell may be slightly darker; veins dark brown; vein R_3 ending on R_{1+2} before wing margin; thickening of costa ending at apex of M_1 .

Abdomen: Yellowish brown, with following dark brownish parts; tergum 1, a band on tergum 2 (whose anterior margin is situated at anterior row of sensory pits), anterior parts of terga 3 and 4, tergum 5, sterna 3-5 (sometimes sternum 3 yellowish brown), and segment 8; segments 6-7 with a dark brownish tinge; abdomen above and below clothed with yellowish brown pile which becomes black on segment 1.

Length: Body (without antenna and ovipositor) 9-10 mm; wing 10-11; fore basitarsus 1.2-1.3.

♂. Unknown.

DISTRIBUTION: W. Java.

Holotype ♀, Mt Gede, Lebak Sive, IX.1937 (BMNH).

Paratype: 1♀, Mt Gede, Lebak Sive, V. 1938 (BMNH).

7. *Rachicerus kotoshensis* Nagatomi, new species Fig. 17-19.

Four ♂♂ and 4 ♀♀ from Kotosho, Taiwan; castaneous, leg yellowish brown to brownish; wing rather strongly tinged with dark brown; antenna 2+26 segmented in 1 ♀ and entirely dark brownish; see couplet 47 of the key. This species is most closely related to *nigrinus* Wandolleck but may be distinguished from the latter by the coloration of leg and number of antennal segment. The species is similar to *galloisi* Séguy but may be separable from the latter by the coloration of wing and of leg.

♂. Head: Shining dark brownish (castaneous); palpus and proboscis brownish; antenna entirely dark brownish (apical part of flagellum is missing in specimens at hand); front may have numerous grooves which are usually very indistinct; ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, antennal segments 1-2, and sometimes upper part of front (below ocellar triangle) black haired; total width of head about 4 × width of face at lowest portion from a direct frontal view; width of front at broadest point 1.2 distance from antenna to median ocellus and 1.5-1.7 width of front at median ocellus which is 1.8-1.9 width of ocellar triangle; antennal segment 1 wider than long (1.3-1.4×) and longest ones of lower processes 2.3-2.6 width of antennal segment 2.

Thorax: Shining dark brownish (castaneous); humeral callus and upper 1/2 of pteropleura yellowish brown to pale brownish; mesonotum and scutellum with pale pile which change into black on posterior border of latter and in some individuals may become entirely black on former; (1) pro-, (2) upper and posterior parts of meso-, and (3) metapleura with black hairs which may be sometimes pale on former 2; haltere yellowish brown.

Leg: Entirely yellowish brown to brownish; coxa, tibia, and femur intermixed with pale and black pile; hind coxa with a ventral process; relative length of segments of fore leg 171 (162-175): 197 (189-200): 100: 35 (33-38): 26 (24-28): 17 (15-18): 30 (28-31), of mid leg 195 (187-200): 206 (200-213): 96 (91-98): 39 (37-40): 26 (24-27): 15 (15-16): 28 (25-31), of hind leg 251 (241-260): 293 (286-305): 120 (120-121): 51(49-53): 27 (26-28): 16 (13-18): 29 (27-31), these were calculated from 4 specimens.

Wing: Membrane rather strongly tinged with dark brown; veins dark brownish to blackish; thickening of costa becomes very narrow beyond apex of R_5 and may end beyond apex of M_2 .

Abdomen: Shining dark brownish (castaneous) and above and below clothed with black hairs.

Length: Body (without antenna) 6-7.5 mm; wing 6-7; fore basitarsus 0.8-0.95.

♀. Similar to ♂ except as follows: Longest ones of lower processes of antennal flagellum 1.0 to 1.1 × width of antennal segment 2; remainder of head structures may almost fit description of ♂, but in specimens at hand width of front at broadest point 1.0-1.1 × distance from antenna to median ocellus and 1.3-1.5 × width of front at median ocellus which is 1.8-2.3 × width of ocellar triangle; antenna 2 + 26 segmented in 1 ♀, its total length about 4 × distance from antenna to median ocellus, and last segment of flagellum 1.1-1.6 × as long as wide; relative length of segments of fore leg 168 (160-172): 193 (181-200): 100: 33 (31-35): 24 (22-26): 16 (14-16): 30 (27-33), of mid leg 195 (186-200): 204 (195-208): 92 (88-98): 37 (35-39): 23 (21-25): 14 (14): 28 (26-30), of hind leg 268 (264-272): 301 (288-314): 120 (116-123): 51 (49-52): 27(26-27): 15 (14-16): 29 (28-30), these were calculated from 4 specimens.

Length: Body (without antenna and ovipositor) 6-8.5 mm; wing 6.5-8.5; fore basitarsus 0.9-1.2.

DISTRIBUTION: Taiwan (Formosa).

Holotype ♂ (NTU), Kotosho (Botel-Tobago), 10.III. - 14.IV. 1920, T. Okuni and J. Sonan.

Paratypes: 3♂♂, 4♀♀, same data as holotype (NTU).

A ♀ specimen from "Tappan", Taiwan (18.VI.1917, T. Shiraki) is similar to *kotoshensis* n. sp. except as follows: Head: Pile on ocellar triangle, vertex, occiput, and cheeks pale in color; antenna 2+34 segmented and 4-5 × distance from antenna to median ocellus, and last segment of flagellum 1 × as long as wide. Leg: Dark brownish especially on coxa and hind femur and hind tibia, rather than yellowish brown or brownish; relative length of segments of fore leg 176-194-100-33-22-15-32, of mid leg 204-207-87-33-24-15-28, of hind leg 268-296-115-50-28-17-30. Length: Body (without antenna and ovipositor) 7 mm; wing ?; fore basitarsus 1.1. This specimen may be different specifically from *kotoshensis* n. sp. It appears to be most closely related to and may possibly belong in *nigrinus* Wandolleck of Sumatra (see couplet 40 of the key).

8. *Rachicerus maai* Nagatomi, new species Fig. 20-22.

Four ♂♂ and 3♀♀ from S. China; yellowish brown but head except its appendages chestnut brown or blackish, antennal flagellum except lower processes largely dark brownish, and in hind leg of ♂, tibia and basitarsus with a dark brownish tinge; wing tinged with yellowish brown to brown but stigma and a region from base of stigma to base of discal cell dark brownish; antenna 2+32-39 segmented in ♂. See couplet 11 of the key. This species may be distinguished from *opulentus* n. sp. of Malay by having stigma of wing dark brownish. The species is easily separated from *pantherinus* n. sp. of S. China and *orientalis* Ouchi of E. China in which at least some terga of abdomen has a basal blackish band.

♂. Head: Chestnut brown or black, shining; palpus, proboscis, and antenna except some portions of flagellum (which are dark brownish) yellowish brown; in antennal flagellum, lower processes, and last 1 or 2 and 1st segment yellowish brown, and segments 2-5 (or 2-6) especially ventral parts with a yellowish brown tinge; front with 2 pairs of longitudinal grooves which run at opposite sides of ocellar triangle (outside of these grooves, 1 or 2 pairs of additional ones may be present); occiput, cheeks, and face more or less pale gray pollinose; ocellar triangle, vertex, occiput, cheeks, palpus, proboscis and antenna with yellow-brown pile which is longer on cheeks and antennal segments 1-2; width of front at broadest point 1.1 distance from antenna to median ocellus, and 1.4-1.5 width of front at median ocellus which is 1.9-2.1 width of ocellar triangle; antenna 2+32, 2+33 (or 34), or 2+39 segmented, its total

length about $6 \times$ distance from antenna to median ocellus, segment 1 about as wide as long ($1.1 \times$), longest ones of lower processes 2.0-2.1 width of segment 2 (of antenna), and last segment of flagellum 2.0-2.2 as long as wide.

Thorax: Yellowish brown; mesonotum with 3 or 4 narrow, dark brownish to blackish longitudinal stripes of which middle one (or inner 2) may be indistinct (these stripes do not extend to anterior and posterior margins of mesonotum respectively); mesonotum, scutellum, pro-, antero-lower, upper, and posterior parts of meso-, ptero- (just below spiracle), and metapleura with yellow-brown pile which is longer on pro- and metapleura; haltere yellowish brown.

Leg: Yellowish brown; in hind leg basal more than $1/2$ of tibia (except knee) and dorso-proximal part of basitarsus with a dark brownish tinge; pile on leg yellowish brown; hind coxa with a ventral process; relative length of segments of fore leg 159 (157-160): 155 (153-157): 100: 30 (28-32): 23 (21-26): 16 (15-17): 28 (26-29), of mid leg 188 (182-191): 183 (178-189): 93 (92-94): 34 (31-37): 25 (23-26): 16 (13-17): 26 (23-29), of hind leg 237 (234-240): 261 (254-266): 122 (117-129): 45 (41-49): 28 (26-29): 18 (15-20): 26 (23-29), these were calculated from 3 specimens.

Wing: Membrane faintly tinged with brown, but costal, subcostal, and 1st basal cells yellowish brown and stigma, apex of subcostal cell, and a region from base of stigma to base of discal cell dark brownish; veins largely dark brown; thickening of costa becomes very narrow beyond apex of R_5 and ends at apex of M_2 .

Abdomen: Yellowish brown, but intersegmental membranes of dorsum blackish; abdomen above and below short yellow-brown pilose (short pile on dorsum may be chiefly black in color; tergum 1 with somewhat longer pale pile in addition to shorter one).

Length: Body (without antenna) 9-12.5 mm; wing 8-11; fore basitarsus 1.1-1.5.

♀. Similar to ♂ except as follows: Head (distal part of flagellum of antenna is broken off in specimens at hand): Structure of head almost fits description of ♂, except for longest ones of lower processes of antennal flagellum which are about equal to ($1.0-1.1 \times$) width of antennal segment 2 (width of front at broadest point 0.9-1.1 distance from antenna to median ocellus and 1.3-1.4 width of front at median ocellus, and antennal segment 1, 0.9-1.2 as wide as long).

Leg: Hind tibia and hind basitarsus without dark brownish tinge; relative length of segments of fore leg 151 (145-156): 155 (145-161): 100: 29 (26-32): 21 (20-22): 15 (15-16): 26 (25-27), of mid leg 182 (174-188): 181 (174-190): 88 (81-93): 31 (28-34): 22 (20-23): 14 (13-16): 24 (22-27), of hind leg 232 (232): 265 (259-271): 118 (114-122): 44 (43-44): 25 (24-25): 17 (15-18): 26 (23-29), these were calculated from 3 specimens (hind leg was based on 2 specimens).

Abdomen: Segment 8 with shining black tinge.

Length: Body (without antenna and ovipositor) 9-14 mm; wing 9.5-15; fore basitarsus 1.3-2.2.

DISTRIBUTION: S. China.

Holotype ♂ (BISHOP 6598), Shaowu, Tachulan, Fukien, 1.VII.1946, T. C. Maa.

Paratypes: 2 ♂♂, 3 ♀♀, Shaowu, Tachulan, 14-18. VII-5.XI., 1942-1946, Maa (BISHOP); 1 ♂, Kienyang, Hwangkeng, Fukien, 22.VI.1942, Maa (BISHOP).

9. *Rachicerus miyatakei* Nagatomi, new species Fig. 23-24.

One ♂ from Thailand; black but mesonotum and scutellum entirely and pleura partially reddish brown and fore leg brownish but coxa and tarsus darker (mid leg broken off); wing as in *varius* n. sp.; antenna 2+26 segmented, largely dark brownish. See couplet 6. This species may be related to *zonatus* Osten Sacken and *flavicornis* S. v. Vollenhoven but is distinguished

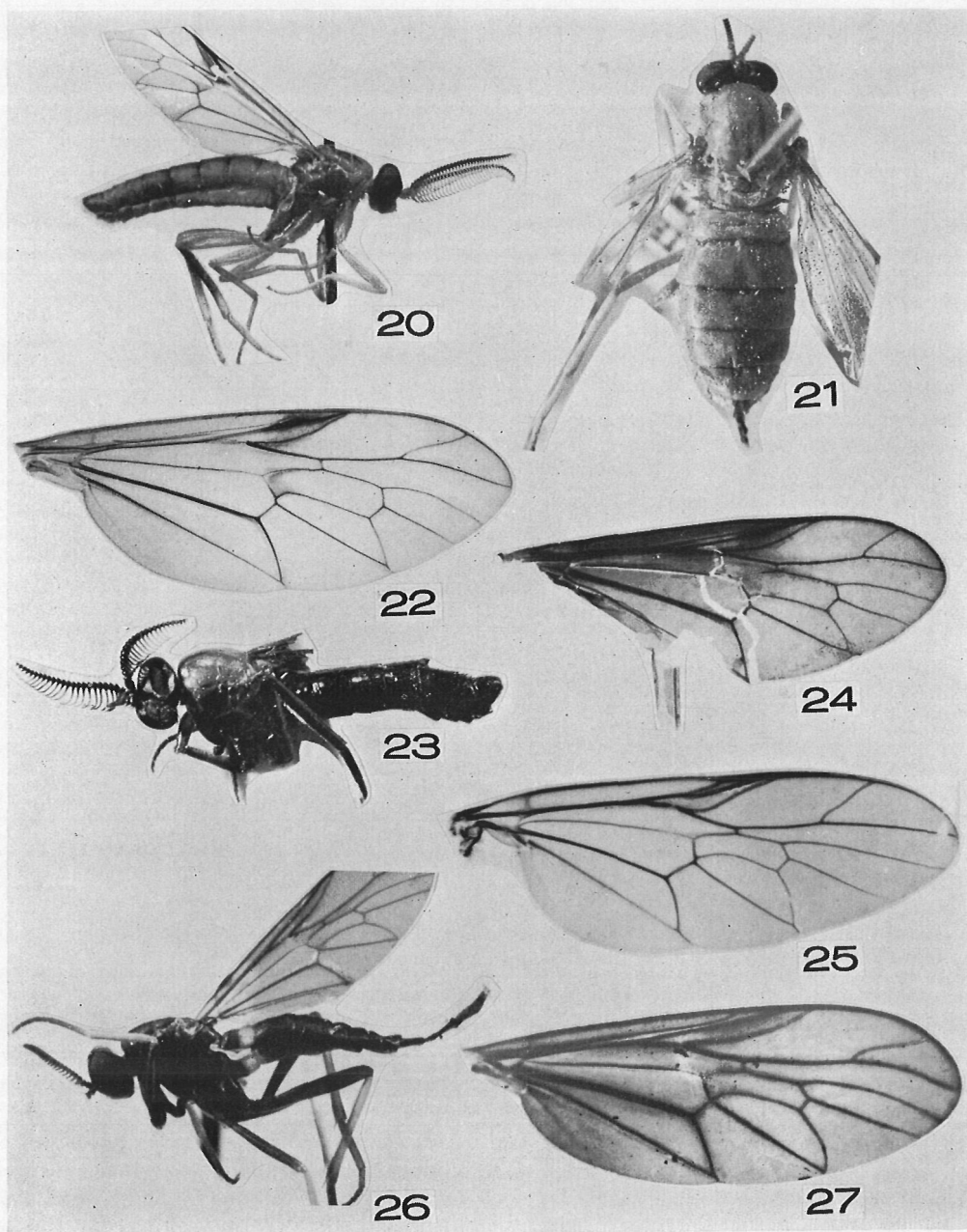


Fig. 20-22. *Rachicerus maai* n. sp. (20 & 22: ♂; 21: ♀). Fig. 23-24. *R. miyatakei* n. sp., ♂. Fig. 25. *R. nigellus* n. sp., ♀. Fig. 26-27. *R. nimbosus* n. sp., ♀.

from both by the coloration of various parts of body. This species is similar to *varius* n. sp. of Thailand but may be separable from the latter by having the abdomen and hind leg entirely black.

♂. Head: Shining black; palpus and proboscis dark brownish but former with apical part brownish and latter may have a brownish tinge; antenna 2+26 segmented, dark brownish but apex of segment 2 brownish and in flagellum lower process of segment 1 (except apex) and those of segments 2-4 (except bases and apices) brownish and lower processes of segments 21 (or 19) - 25 and entire surface of last segment pale yellowish brown; front with 3 pairs of indistinct grooves running at opposite sides of ocellar triangle; ocellar triangle, vertex, occiput, cheeks, palpus, and proboscis with pile which appears to be yellowish brown and antennal segments 1-2 black-haired; width of front at broadest point somewhat longer than distance from antenna to median ocellus ($1.2 \times$) and 1.4 width of front at median ocellus which is $2.4 \times$ width of ocellar triangle; antenna about $6 \times$ distance from antenna to median ocellus, segment 1 about as wide as long, longest ones of lower processes 2.8 as long as width of segment 2 (of antenna) and last segment of flagellum $2 \times$ or less ($1.4-2.0 \times$) as long as wide.

Thorax: Polished, and reddish brown but pleura except pro-, upper and anterior parts of meso-, upper 1/2 of pteropleura blackish; posterior part of sternopleura with a red-brown tinge; hairs as in *varius* n. sp.; haltere broken off in specimen at hand.

Leg: Hind leg entirely black (apex of femur may have a brownish tinge); in fore and mid legs coxa and trochanter blackish but fore coxa with a brownish tinge and in fore leg femur, tibia, and basal portion of basitarsus brownish and tarsus blackened (mid leg except coxa and trochanter missing in specimen at hand); hind coxa with a ventral process; relative length of segments of fore leg 174-160-100-28-20-14-24, of mid leg?, of hind leg 250-276-120-42-24-16-26.

Wing: As in *varius* n. sp., but thickening of costa ending beyond apex of M_2 .

Abdomen: Entirely black; abdomen above and below clothed with short black pile.

Length: Body (without antenna) 9 mm; wing 7; fore basitarsus 1.0.

♀. Unknown.

DISTRIBUTION: Thailand.

Holotype ♂, Mae Sa Water Fall, near Chiang Mai City, N. Thailand, 16.VI.1965, Y. Miyatake (KU).

10. *Rachicercus nigellus* Nagatomi, new species Fig. 25.

One ♂ and 1 ♀ from Java; dark brownish; in ♀ dorsal surface of tibia (except apical part) pale yellowish brown; wing very faintly tinged with dark brown; antenna 2+18 segmented in ♂. See couplet 46 of the key. This species is similar to *aterrimus* Senior-White but may be distinguished from the latter as shown in the key. The species may be at once separated from *fulvicornis* S. v. Vollenhoven of Java by having the thorax dark brownish, by having the wing without a median band, and by having the antenna 2+18 segmented and entirely dark brownish.

♂. Head: Dark brownish (castaneous) and shining; palpus, proboscis, and antenna also entirely dark brownish; front with numerous very indistinct grooves; ocellar triangle, vertex, occiput, cheeks, proboscis and antennal segments 1-2 with hairs which appear to be black and which are shorter on ocellar triangle and proboscis; palpus with hairs which appear to be pale in color; width of front at broadest point longer than ($1.3 \times$) distance from antenna to median ocellus and somewhat more than ($1.2 \times$) width of front at median ocellus which is about $2.5 \times$ width of ocellar triangle; antenna 2+18 segmented, its total length $4.7 \times$ distance from antenna to median ocellus, segment 1 somewhat wider than long ($1.3 \times$), longest ones of lower processes $2.2 \times$ width of segment 2 (of antenna), and last segment of flagellum about 2.5 as long as wide.

Thorax: Dark brownish (castaneous) and shining, but humeral callus and upper margin of mesopleura pale yellowish brown or whitish and upper 1/2 of pteropleura with a pale yellow-brown tinge; mesonotum may have 3 indistinct, narrow blackish stripes; mesonotum and scutellum with pale yellow brown pile which is longer and appears to be black on latter and posterior border of former; pro-, upper portion of meso-, and metapleura long black-haired; haltere dark brownish.

Leg (fore leg except coxa, mid tarsus, and last 2 segments of hind tarsus are broken off): Dark brownish (castaneous) and shining; hairs on leg appear to be black, and are long on hind femur and on antero-proximal surface of mid and hind tibiae but are shorter and pale yellowish brown on posterior surface of hind tarsus and that of apical portion of hind tibia; hind coxa with a ventral process; relative length of segments of fore leg?, of mid leg 60-62-?-?-?-?, of hind leg 72-92-36-13-8.5-?-?-?.

Wing: Membrane faintly tinged with dark brown; apex of subcostal and that of marginal cell may be slightly darker; veins dark brown; thickening of costa ends beyond apex of M_1 .

Abdomen: Dark brownish (castaneous) and shining; abdomen above and below with short black hairs which become much longer on sides of dorsum.

Length: Body (without antenna) 5.5 mm; wing 5; fore basitarsus?.

♀. Similar to ♂ except as follows: Head (antenna except segments 1-2 is broken off): Hairs on head appear to be pale except for those on antennal segments 1-2 (this may partially be true of the ♂); structure of head almost fits description of ♂ (in specimen at hand width of front at broadest point 1.2 distance from antenna to median ocellus and 1.1 width of front at median ocellus, and antennal segment 1, 1.1 as wide as long).

Thorax: Hairs on scutellum, posterior portion of mesonotum, pro- and upper portion of mesopleura appear to be pale (this may be true of the ♂).

Leg: Fore femur and fore tibia may be brownish rather than dark brownish; each leg with dorsal surface of tibia except apical portion pale yellowish brown or whitish; hairs on femur appear to be at least partially pale (this may be true of the ♂) and those on whitish part of tibia are whitish in color and long; hairs on hind femur shorter than in ♂; relative length of segments of fore leg 170-193-100-30-20-16-32, of mid leg 198-216-107-32-20-14-27, of hind leg 241-320-116-41-23-14-32.

Length: Body (without antenna and ovipositor) and wing 7 mm; fore basitarsus 0.9.

DISTRIBUTION: Java.

Holotype ♂ (BISHOP 6599), Java, XII.1908, Terry. Paratype: 1 ♀, same data as holotype (BISHOP).

11. *Rachicerus nimbosus* Nagatomi, new species Fig. 26-27.

One ♀ from Sabah (N. Borneo); dark brownish to blackish, but tibia, haltere, and anterior part of abdominal segment 2 whitish; wing strongly tinged with dark brown; antenna 2+19 segmented. See couplet 45 of the key. This species may be distinguished from other members of the genus by the above combination of characters. Among the species known from Borneo this species is most closely related to *flabellum* but is easily separated from the latter in which the last segment of flagellum flattened dorsoventrally, the lower processes of flagellum very long in both sexes, and the basitarsus distinctly whitish to pale brownish.

♀. Head: Shining blackish; palpus, proboscis, and antennal flagellum dark brownish; flagellum with almost entire surface of segment 1 and lower processes of segments 2-3 (or 2-4) paler in color; front with 2 pairs of longitudinal grooves of which inner one may not attain opposite sides of ocellar triangle; face more or less pale gray pollinose; ocellar triangle,

vertex, occiput, and cheeks pale pilose and proboscis, palpus, and antennal segments 1-2 black-haired; width of front at broadest point equal to distance from antenna to median ocellus and 1.5 width of front at median ocellus which is 1.9 width of ocellar triangle; antenna 2+19 segmented, its total length 3.6 distance from antenna to median ocellus, segment 1, 0.8 as wide as long, longest ones of lower processes about equal to $(1.1 \times)$ width of segment 2 (of antenna), and last segment of flagellum 1.25 as long as wide.

Thorax: Dark brownish to blackish, but humeral callus and upper margin of mesopleura pale brownish; mesonotum and scutellum short pale pilose; pro-, postero-upper part of meso-, ptero- (below spiracle), and metapleura with pale hairs which are short and inconspicuous on meso- and pteropleura and which may be intermixed with black ones on metapleura; haltere whitish to pale brownish.

Leg: Dark brownish, but tibia whitish to pale brownish (although ventral surface of each tibia and apical part of hind tibia may be somewhat darker); coxa with short pale pile which becomes somewhat long and black on ventrodistal part of hind leg; femur with short black pile which becomes pale on ventral surfaces of mid and hind legs; pile on tibia pale, but chiefly black on anterior and ventral surfaces of fore leg, ventral surface of mid leg, and apical part of hind leg; hind coxa with a ventral process; relative length of segments of fore leg 153-164-100-29-20-13-22, of mid leg 180-180-100-33-20-13-22, of hind leg 242-249-107-42-22-13-24.

Wing: Membrane strongly tinged with dark brown and stigma slightly darker; veins dark brown; thickening of costa ends beyond apex of M_2 .

Abdomen: Dark brownish to blackish, but sternum 1 (except posterolateral parts), anterior part of sternum 2 (before posterior (or 2nd) row of sensory pits) and that of tergum 2 except lateral margins (before anterior (or 1st) row of sensory pits) pale brownish; abdomen above and below clothed with short black hairs which do not become long on sides of dorsum (sternum 1 and pale brownish part of segment 2 are at least practically bare); cercus, which is pale brownish, and segment 9 pale pilose.

Length: Body (without antenna and ovipositor) and wing 6 mm; fore basitarsus 0.9.

♂. Unknown.

DISTRIBUTION: Sabah (N. Borneo).

Holotype ♀ (BISHOP 6600), N of Kalabakan, 8.XI.1962, Y. Hirashima.

12. *Rachicercus obatratus* Nagatomi, new species Fig. 28-30.

One ♂ from Sabah (N. Borneo); dark brownish to blackish, but tibia and fore and mid tarsi largely or partly and haltere entirely whitish and basal parts of lower processes of antennal flagellum yellowish brown; wing very faintly tinged with brown and stigma and area above and below stigma distinctly dark brown; antenna 2+28 segmented. See couplet 38 of the key. This species is most closely related to *robustus* Frey but may be distinguished from *robustus* by the coloration of its leg. Among the species known from Borneo, this species is peculiar in the wing which has a median band from stigma to the base of 4th posterior cell.

♂. Head: Shining black; proboscis brownish to dark brownish, and palpus and antenna dark brownish to blackish but lower processes of antennal flagellum with yellow-brown basal parts which are gradually smaller in area distally; front with 5 longitudinal grooves with median and outer pair not reaching to ocellar triangle or its opposite sides; face more or less white-gray pollinose; ocellar triangle, vertex, and occiput pale pilose, and cheeks, palpus, proboscis, and antennal segments 1-2 black-haired; upper part of front (before ocellar tubercle) may have a few hairs; width of front at broadest point about equal to $(1.1 \times)$ distance from antenna to median ocellus and 1.4 width of front at median ocellus which is 2.4 width

of ocellar triangle; antenna 2 + 28 segmented, its total length 4.3 distance from antenna to median ocellus, segment 1, 1.3 as wide as long, longest ones of lower processes 2.8 width of segment 2 (of antenna), and last segment of flagellum 1.8 as long as wide.

Thorax: Dark brownish to blackish, but humeral callus and upper margin of mesopleura whitish or pale brownish; mesonotum, scutellum, antero-lower, upper, and posterior parts of mesopleura at least chiefly pale pilose, and pro- and metapleura longer black-haired; haltere whitish or pale yellowish.

Leg: Dark brownish to blackish, but in tibia and tarsal segments 1-2 of fore and mid legs dorsal surface and in hind tibia anterior surface and dorsobasal part whitish or pale brownish; extreme apex of each femur yellowish brown; coxa and femur with pale pile which becomes black on anterodorsal surface of latter; tibia covered with pale hairs which are intermixed with many black ones on anteroventral surface of fore leg, on posteroventral surface of mid leg, and on posterior surface of hind leg; hind coxa with a ventral process; relative length of segments of fore leg 171-164-100-25-16-13-23, of mid leg 186-177-91-29-18-14-23, of hind leg 234-252-118-45-23-16-23.

Wing: Membrane very faintly tinged with brown, and stigma, apical parts of costal and subcostal cell, and a band from stigma to base of 4th posterior cell dark brown; veins dark brown; thickening of costa ends beyond apex of M_2 .

Abdomen: Dark brownish to blackish, but intersegmental membranes between sterna 1-2, 2-3, and 3-4 yellowish brown; dorsum with pale pile which is longer on sides and is intermixed with black one on lateral margin; venter with black hairs.

Length: Body (without antenna) 8.5 mm; wing 7.5; fore basitarsus 1.1.

♀. Unknown.

DISTRIBUTION: Sabah (N. Borneo).

Holotype ♂ (BISHOP 6601), N of Kalabakan, 17. XI. 1962, K. J. Kuncheria.

13. *Rachicerus opiparus* Nagatomi, new species Fig. 31-32.

One ♀ from Sumatra; yellowish brown, but ocellar triangle, median occipital region, antennal flagellum (except lower processes and some basal segments), mesonotum (except lateral part behind suture and posterior part), hind tibia (except apical part), base of hind femur, and abdominal segments 4 and 5 dark brownish to blackish; antenna probably 2+ nearly 30 segmented; see couplet 15 of the key. This species is peculiar in the markings of thorax and abdomen.

♀. Head (apical part of antennal flagellum broken off): Yellowish brown but ocellar triangle, vertex, and median occipital region dark brownish to blackish and front just before median ocellus with a dark brownish tinge; palpus, proboscis, and antenna yellowish brown but flagellum except lower processes dark brownish (flagellar segments 1-5 or more yellowish brown or with a yellow-brown tinge); ocellar triangle, vertex, occiput, cheeks, palpus, proboscis and 1st 2 antennal segments with yellow-brown pile; total width of head 3.6 width of face at lowest portion from a direct frontal view; width of front at broadest point about equal to distance from antenna to median ocellus (1.1 ×) and somewhat more than width of front at median ocellus (1.2 ×), which is 2.7 width of ocellar triangle; antenna 2+ over 21 (probably 2+ nearly 30) segmented, segment 1 nearly as wide as long (0.8 ×) and longest ones of lower processes 1.8 as long as width of segment 2 (of antenna).

Thorax: Mesonotum blackish but humeral callus, lateral part behind suture (which includes posterior callus) and posterior part yellowish brown; pleura, scutellum, and postscutellum entirely yellowish brown; mesonotum and scutellum with black pile which is intermixed with yellowish brown on lateral margin of former (pile on humeral callus entirely yellowish

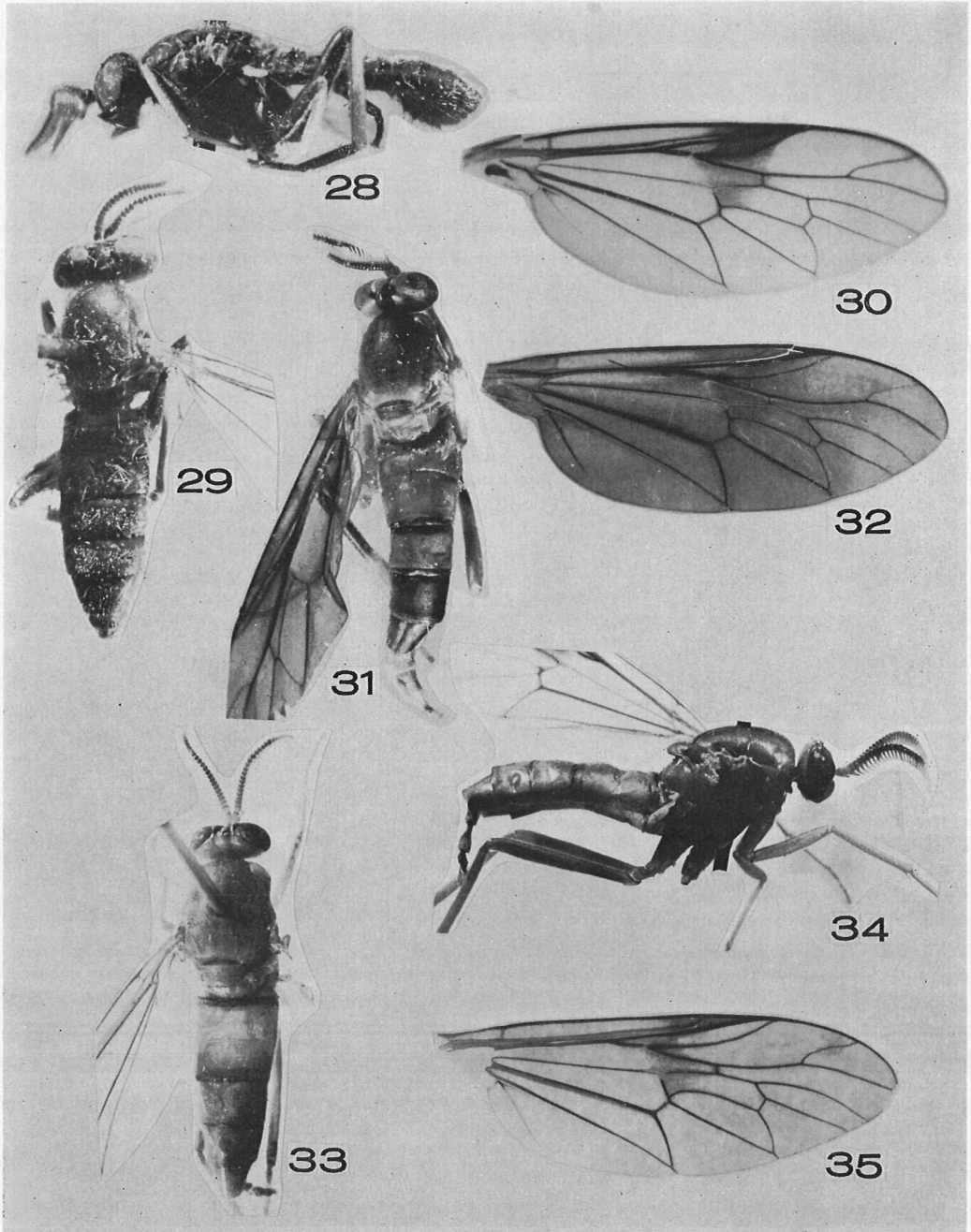


Fig. 28-30. *Rachicerus obatratus* n. sp., ♂. Fig. 31-32. *R. opiparus* n. sp., ♀. Fig. 33-35. *R. opulentus* n. sp., ♀.

brown); pro-, upper and posterior parts of meso-, and metapleura yellow-brown pilose; haltere yellowish brown.

Leg (last 3 tarsal segments of mid and hind legs broken off): Yellowish brown but in hind leg tibia except less than apical 1/2 blackish and trochanter and base of femur with a blackish tinge which is present on last 3 or 4 tarsal segments of fore leg (this may be true of mid and hind tarsi); pile on coxa, femur and tibia yellowish brown; coxa with a midventral process; relative length of segments of fore leg 153-168-100-29-21-15-26, of mid leg 176-182-91-29-?-?-?, of hind leg 241-253-118-41-21-? -?.

Wing: Membrane rather strongly tinged with dark brown, apical parts of costal- and of subcostal cell, and stigma may be slightly darker; veins dark brown; thickening of costa ending beyond apex of R_5 .

Abdomen: Yellowish brown, but segments 4 and 5 except posterior and lateral parts of sterna 4 and 5 and anterior margin of tergum 3 dark brownish to blackish; pile on dorsum except sides black but that on venter and ovipositor yellowish brown.

♂. Unknown.

Length: Body (without antenna and ovipositor) 14 mm; wing 14; fore basitarsus 2.1.

DISTRIBUTION: W. Sumatra.

Holotype ♀, Benkoelen, Boekit Itam, 540 m, VI.1935 (BMNH).

14. *Rachicerus opulentus* Nagatomi, new species Fig. 33-35.

One ♀ from Malay. See couplet 11 of the key. The species may be distinguished from *maai* n. sp. of S. China by having stigma of wing unmarked. This species and *maai* are peculiar in the thorax and abdomen which are entirely yellowish (or somewhat reddish) brown (except intersegmental membranes of abdomen and in *maai* stripes on mesonotum).

♀. Head: Yellowish (or somewhat reddish) brown; front (except just above antennae) and ocellar triangle darkened and shining; antennal flagellum except lower processes darkened but 1st 3 or more and last 6 or 7 segments concolorous with lower processes; front with a pair of distinct grooves running at opposite sides of ocellar triangle; ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, 1st 2 antennal segments yellow-brown pilose; total width of head 3.6 width of face at lowest portion from a direct frontal view and 2.6 width of front at broadest point; width of front at broadest point somewhat longer than distance from antenna to median ocellus (1.2 ×) and width of front at median ocellus (1.3 ×) which is 2.6 width of ocellar triangle; antenna 2+28 segmented, its total length 5.5 distance from antenna to median ocellus, segment 1 as wide as long, longest ones of lower processes somewhat longer than width of segment 2 (of antenna) (1.3 ×), and last segment of flagellum 1.5 as long as wide.

Thorax, haltere, leg, and abdomen: Yellowish (or somewhat reddish) brown; intersegmental membranes of abdomen, and ovipositor (except proctiger and cercus) especially segment 8 darkened and shining; pile on thorax (mesonotum, scutellum, pro-, upper and posterior parts of meso-, and metapleura), leg, and abdomen yellowish brown; abdominal tergum 1 may have very short black, recumbent pile in addition to longer, erect, yellowish brown one; hind coxa with a mid-ventral process; relative length of segments of fore leg 144-147-100-26-19-13-27, of mid leg 173-173-96-28-18-11-25, of hind leg 235-254-124-45-20-12-26.

Wing: Membrane tinged with yellowish brown; apex of costal cell, apical portion of subcostal cell and a region from just above fork of R_s to base of discal cell darkened; stigma not marked; veins dark brownish; thickening of costa becomes very narrow just beyond apex of R_5 .

Length: Body (without antenna and ovipositor) 13 mm, wing 15, fore basitarsus 2.1.

♂. Unknown.

DISTRIBUTION: Malay.

Holotype 1♀, Cameron Highlands, Pahang, 8.V.1929, H. M. Pendlebury (BMNH).

A ♀ specimen (whose antennal flagellum and fore and mid legs are broken off) from Mt Ardjoeno, E. Java, I. 1936 (BMNH), may belong to this species. The front except for an elongate spot just before ocellar triangle is reddish brown and the width of front at median ocellus is 2.2 width of ocellar triangle.

15. *Rachicerus pantherinus* Nagatomi, new species Fig. 36-37.

One ♂ from S. China; yellowish brown; 2 distinct stripes on mesonotum, some parts of pleura and of abdomen, and hind coxa and hind tibia dark brownish; antenna 2+ over 20 (probably nearly 30) segmented. See couplet 22 of the key. This species is similar to *tigrinus* n. sp. of N. Borneo but may easily be separated by differences in the markings of thorax and abdomen. The species appears to be most closely related to *orientalis* Ouchi of E. China but may be distinguished from the latter in which the stripes on mesonotum are indistinct (in ♀) or not present (in ♂) and wing is "darker at stigmatic portion....."

♂. Head (apical part of antenna broken off): Shining blackish, but palpus, proboscis, central part of face (except upper portion), and larger part of antenna yellowish brown; antennal flagellum except lower processes dark brownish (segment 1 of flagellum almost entirely yellowish brown; apices and bases of lower processes may have a dark brownish tinge); ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, and 1st 2 antennal segments with yellow-brown hairs (front may have a few hairs); front with 4 or more grooves; width of front at broadest point somewhat longer than (1.1 ×) distance from antenna to median ocellus, and 1.6 × width of front at median ocellus which is 1.8 × width of ocellar triangle; antenna 2+ over 20 (probably 2+ nearly 30) segmented, segment 1, 1.5 × as wide as long, and longest ones of lower processes of flagellum 2.2 as long as width of segment 2 (of antenna).

Thorax: Yellowish brown; mesonotum has 2 broad dark brownish stripes with outer parts paler in color and with both ends extending neither anterior nor posterior margins of mesonotum (the stripes begin near mid-outer margin of humeral callus and ends near that of posterior callus); meso- (except anterior part), meta- (except posterior part), anterior part of sterno-, and lower part of pteropleura dark brownish; mesonotum, scutellum, pro-, meta-, upper and posterior parts of meso-, and posterior part of pteropleura yellow-brown pilose; haltere yellowish brown.

Leg: Yellowish brown, but in hind leg coxa and tibia tinged with dark brownish; base of hind femur may be slightly infuscated; vestiture on coxa, femur and tibia entirely yellowish brown; hind coxa with a mid-ventral process; relative length of segments of fore leg 160-166-100-31-24-14-21, of mid leg 181-186-102-31-24-14-24, of hind leg 240-257-119-45-29-17-26.

Wing: Membrane tinged with brown; stigma not marked; veins dark brown; in the specimen on hand vein Sc does not reach to wing margin (=apical portion of vein Sc disappear).

Abdomen: Yellowish brown; tergum 1, a median band on tergum 2 (whose anterior margin is situated at an anterior row of sensory pits), and anterior parts of terga 3-5 (whose areas are gradually larger posteriorly) dark brownish; anterior part of sternum 5 and that of tergum 6 tinged with dark brownish; abdomen above and below chiefly clothed with yellowish brown pile.

Length: Body (without antenna) 8 mm; wing 7; fore basitarsus 1.0.

♀. Unknown.

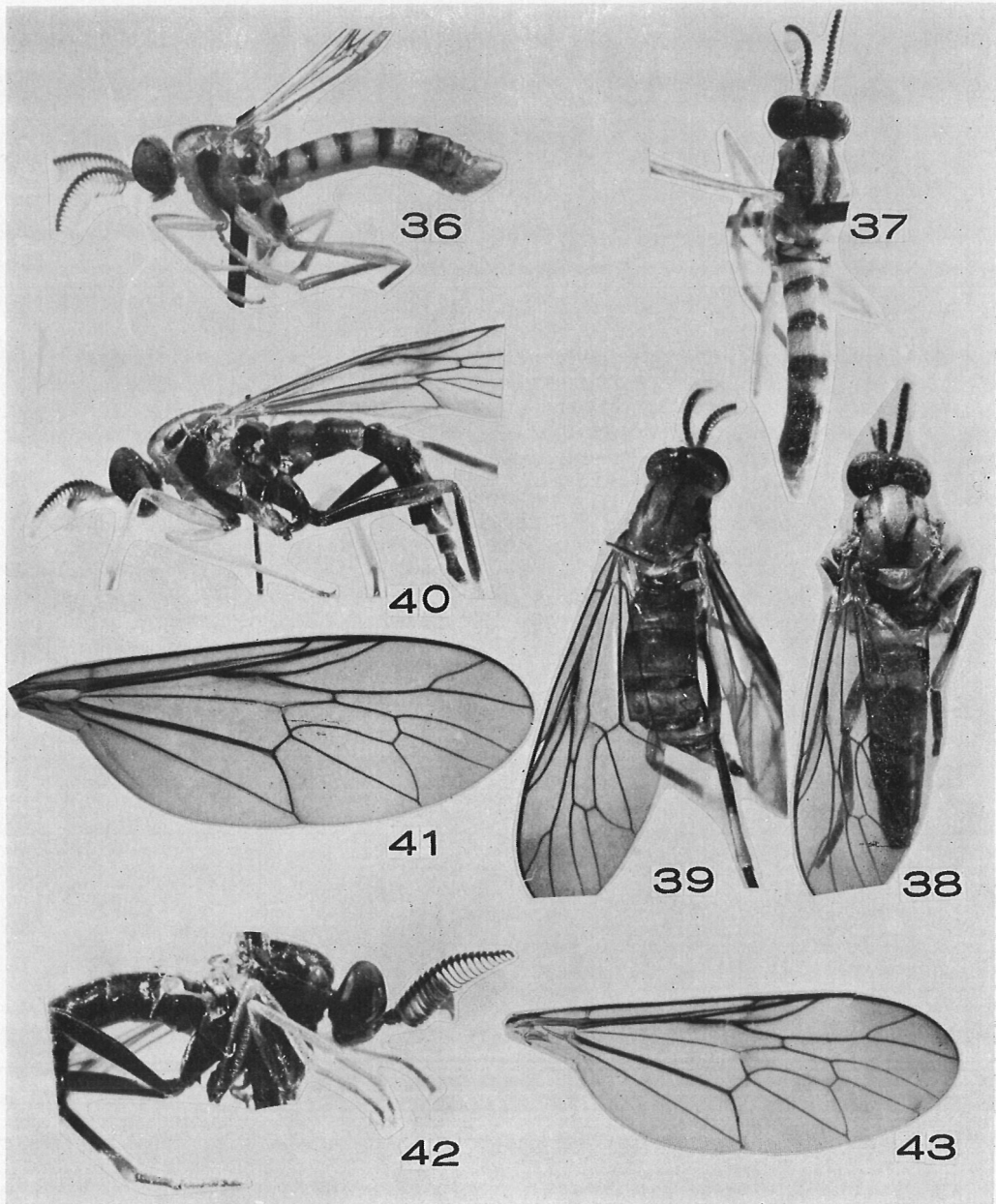


Fig. 36-37. *Rachicerus pantherinus* n. sp., ♂. Fig. 38-41. *R. plagosus* n. sp. (38 & 41: ♂; 39-40: ♀). Fig. 42-43. *R. pullus* n. sp., ♂.

DISTRIBUTION : S. China.

Holotype ♂, Yim Na San, 750 m, E. Kwangtung, 11. VI. 1936, J. L. Gressitt (USNM).

16. **Rachicercus plagosus** Nagatomi, new species Fig. 38-41.

One ♂ and 1 ♀ from S. India; yellowish brown, but head except its appendages, 2 stripes on mesonotum, a spot on notopleura, several parts of pleura, those of leg and those of abdomen blackish; antennal flagellum except lower processes largely dark brownish; wing faintly tinged with dark brown; antenna in ♀ 2+20 (or 21) segmented; see couplet 23 of the key. This species is distinguished from *guttatus* n. sp. of Java as shown in the key.

♀. Head: Shining dark brownish to blackish, but median occipital region brownish and palpus, proboscis, and 1st 2 segments of antenna yellowish brown; flagellum of antenna dark brownish to blackish but lower processes, and entire surface of segment 1 and those of last 4 segments yellowish brown (apices of lower processes of segments 4-9 tinged with dark brownish); ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, and 1st 2 segments of antenna with pale yellow-brown hairs which appear to be partly blackish on last mentioned one; front with 2 or more pairs of grooves; total width of head about $6 \times$ width of face at lowest portion from a direct frontal view; width of front at broadest point equal to distance from antenna to median ocellus and $1.4 \times$ width of front at median ocellus which is $2 \times$ width of ocellar triangle; antenna 2+20 (or 21) segmented, its total length $3.8 \times$ distance from antenna to median ocellus, segment 1 about as wide as long ($1.1 \times$), longest ones of lower processes somewhat longer than ($1.3 \times$) width of segment 2 (of antenna), and last segment of flagellum about $1\frac{1}{2}$ ($1.6 \times$; in left antenna) or $\frac{4}{5}$ (in the right) as long as wide.

Thorax: Yellowish brown, with following dark brownish to blackish parts: 2 distinct narrow stripes on mesonotum, a lateral spot just behind humeral callus, meso- (except anterior and upper margins), sterno- (except posterior $\frac{1}{2}$), meta- (except posterior border), hypo-, and lower part of pteropleura and middle portion of postscutellum; stripes on mesonotum begin near mid-outer part of humeral callus and end opposite wing-base; mesonotum, scutellum, pro-, upper and posterior margins of meso-, and metapleura with pale yellow-brown pile; haltere yellowish brown.

Leg: Yellowish brown; hind femur and hind tibia each except less than apical $\frac{1}{2}$ and hind basitarsus except apex dark brownish to blackish; last 3 segments of tarsi, trochanters, hind coxa, and base of mid tibia with a dark brownish tinge; pile on coxa, femur, and tibia pale yellowish brown; relative length of segments of fore leg 175-175-100-32-18-16-25, of mid leg 207-203-98-29-20-14-25, of hind leg 264-298-123-45-25-16-25.

Wing: Membrane faintly tinged with dark brown; stigma not marked; veins dark brown; costa practically ending just beyond apex of vein R_5 .

Abdomen: Yellowish brown; tergum 1, a band on tergum 2 (whose anterior margin is situated at anterior row of sensory pits), anterior borders of terga 3-5 dark brownish to blackish; segment 8 and sterna 3 (or 2) -5 tinged with dark brownish; abdomen above and below clothed with pale yellow-brown pile.

Length: Body (without antenna and ovipositor) 8.5 mm; wing 8.5; fore basitarsus 1.1.

♂. There is a specimen in not very good condition (distal part of antenna is broken off, and head and thorax are musty). This specimen seems to belong in *plagosus*, but differs from the description of ♀ given above in the following points: Head: Distal parts of lower processes and upper surface of flagellar segment 1 distinctly dark brownish; median occipital region shining blackish; structures of head similar to ♀, except for longest ones of lower processes which are 2.3 width of antennal segment 2 (width of front at broadest point $1.6 \times$ that at median ocellus; antenna 2+ over 13 segmented).

Thorax : Stripes connected to each other near posterior border of mesonotum and reaching posterior margin of mesonotum (this may be true of the ♀, due to the individual variations); the pile on metapleura appears to be blackish.

Abdomen : Segments 4-7 and genitalia entirely dark brownish to blackish; sternum 2 almost entirely yellowish brown; pile on sterna 5-7 and on ventral part of genitalia appears to be black.

Leg : Relative length of segments of fore leg 184-177-100-32-20-16-25, of mid leg 200-191-104-34-20-16-25, of hind leg 239-275-114-48-23-16-25.

Length : Body (without antenna) 10 mm; wing 8; fore basitarsus 1.1.

DISTRIBUTION : S. India.

Holotype ♀, Thekkadi, Periyar Dam, Travancore, 6-10. V. 1937 (BMNH).

Paratype : 1♂, same as type.

17. *Rachicerus pullus* Nagatomi, new species Fig. 42-43.

One ♂ from S. India; brownish to blackish, but palpus, proboscis, humeral and posterior calli, upper 1/2 of pteropleura, haltere, and some parts of leg yellowish brown and mesonotum with darker parts (a spot on notopleura and a pair of stripes); wing faintly tinged with dark brown; antenna 2 + 19 segmented; see couplet 44 of the key. This species is easily separated from *flabellum* n. sp. as shown in the key.

♂. Head : Shining blackish; palpus and proboscis yellowish brown; antenna dark brownish but in each of lower processes of flagellar segments 1-3 (or 1-4) more than basal 1/2 yellowish brown; front with 2 pairs of grooves (which run at opposite sides of ocellar triangle) and a median groove (which extends to median ocellus); ocellar triangle, vertex, occiput, cheeks, and proboscis pale yellow-brown pilose; 1st 2 antennal segments and palpus with black hairs; width of front at broadest point slightly longer than distance from antenna to median ocellus (1.1×) and 1.4 width of front at median ocellus which is 2.1 width of ocellar triangle; antenna 2 + 19 segmented, its total length 4.3 distance from antenna to median ocellus, segment 1 as wide as long, longest ones of lower processes 2.1 as long as width of segment 2 (of antenna) and last segment of flagellum 2.3 as long as wide.

Thorax : Brownish to dark brownish, but humeral callus, posterior callus, upper margin of meso-, upper 1/2 of sternopleura, etc. yellowish brown; mesonotum with following blackish parts: a very narrow, inconspicuous median stripes, a pair of rather broad stripes connected to each other on posterior portion of mesonotum, and a spot on notopleura; mesonotum, scutellum, pro-, and upper and posterior parts of mesopleura with pale yellow-brown pile and metapleura with black hairs; haltere yellowish brown.

Leg : Fore and mid legs yellowish brown but coxa and femur brownish to dark brownish (apical part of femur become paler) and last 4 segments of tarsus with a dark brownish tinge; hind leg dark brownish but apex of tibia yellowish brown; pile on coxa, femur and tibia pale in color; relative length of segments of fore leg 184-188-100-31-22-16-28, of mid leg 206-203-94-34-22-16-28, of hind leg 265-300-116-47-28-19-31.

Wing : Membrane faintly tinged with dark brown; stigma not marked; veins dark brown; thickening of costa becomes very narrow just beyond apex of R₅ and may end at apex of M₂.

Abdomen : Dark brownish; pile on abdomen appears to be pale yellowish brown but that on segments 6-7 black.

Length : Body (without antenna) 7 mm; wing 6; fore basitarsus 0.8.

DISTRIBUTION : S. India.

Holotype ♂, Kodaikanal, 1950 m, Pulni Hills, III-IV. 1953, P. Susai Nathan (USNM).

18. *Rachicerus rusticus* Nagatomi, new species Fig. 44-46.

Two ♂♂ and 1 ♀ from Ceylon; yellowish brown to brownish; head shining black; antenna at least partly dark brownish; thorax brownish to dark brownish (mesonotum paler in color in ♀ than in ♂); hind femur and hind tibia each with darker basal part becoming smaller in ♀; wing tinged with brown; antenna 2+17-18 (in ♂) or 2+20 (in ♀) segmented; see couplet 14 of the key. This species is very closely related to *brevicornis* Kertész but may be distinguished from the latter by having a very narrow median darker stripe on mesonotum. The species may easily be separated from *bicolor* Brunetti and *aterrimus* Senior-White, both of which are recorded from Ceylon, by having the abdomen almost entirely brown to brownish.

♂. Head: Dark brownish to blackish and shining (central part of face with a brownish tinge); palpus and proboscis yellowish brown; antenna dark brownish but apex of segment 2 and lower processes (except apical portions) on flagellar segments 1-3 (or 1-4) yellowish brown (sometimes segments 1-2 and lower processes on all of flagellar segments with a yellow-brown tinge); front with several pairs of grooves; ocellar triangle, vertex, occiput, cheeks and 1st 2 antennal segments yellowish-brown haired; width of front at broadest point 1.2 distance from antenna to median ocellus, and 1.4 width of front at median ocellus, which is 1.9-2.1 width of ocellar triangle; antenna 2+17-18 segmented, its total length 4.2-4.5 distance from antenna to median ocellus, segment 1 about as wide as long (1.0-1.2×), longest ones of lower processes 2.1-2.4 as long as width of segment 2 (of antenna), and last segment of flagellum 2.1-2.3 as long as wide.

Thorax: Brownish to dark brownish but humeral callus, pro-, and upper part of sternopleura, etc., yellowish brown; mesonotum with following darker areas which may be somewhat indistinct: 3 stripes of which median one is very narrow and a spot just behind each humeral callus; mesonotum, scutellum, pro-, upper and posterior margins of meso-, and metapleura with yellowish brown hairs; haltere yellowish brown.

Leg: Yellowish brown to brownish; hind leg with femur and tibia each except for less than apical 1/2 and trochanter somewhat darker; last 3 segments of tarsi and hind coxa may have a dark brownish tinge; pile on coxa, femur, and tibia yellowish brown; hind coxa with mid-ventral process; relative length of segments of fore leg 179 (174-184) : 175 (174-176) : 100 : 34 (32-36) : 24 (23-24) : 18 (17-18) : 31 (28-33), of mid leg 206 (200-212) : 203 (196-209) : 99 (94-103) : 36 (32-39) : 25 (23-27) : 16 (13-18) : 29 (28-30), of hind leg 263 (251-275) : 289 (277-300) : 125 (119-130) : 49 (47-50) : 28 (26-30) : 18 (15-20) : 33 (32-33), these were calculated from 2 specimens.

Wing: Membrane tinged with brown; stigma not distinctly marked; veins dark brown; thickening of costa ending just beyond apex of vein M₂.

Abdomen: Yellowish brown to brownish; tergum 1 and genitalia with a dark brownish tinge; abdomen above and below yellow-brown pilose.

Length: Body (without antenna) 7-10 mm; wing 7-9; fore basitarsus 0.8-1.1.

♀. A specimen seems to belong to this species. It differs from the description of ♂ mentioned above in the following points: Head: In antennal flagellum 1st 3 segments and lower processes (except those on last 6 or 7 segments which are dark brownish) entirely yellowish brown; total width of head 4 × width of face at lowest portion from a direct frontal view (in ♂ 5 ×); antenna 2+20 segmented, longest ones of lower processes about equal to width of segment 2 (of antenna) (0.9 ×), and last segment less than 2 × as long as wide (1.3 ×); in specimen on hand width of front at broadest point 1.3 × and antenna 3.3 × distance from antenna to median ocellus respectively.

Thorax: Mesonotum paler in color than in ♂.

Leg: In hind femur and hind tibia darker basal parts become inconspicuous (smaller in area); relative length of segments of fore leg 171-176-100-32-22-13-27, of mid leg 206-202-94-33-25-16-25, of hind leg 266-301-126-49-29-18-30.

Abdomen: Intersegmental membranes and ovipositor especially segment 8 shining dark brownish (proctiger and cercus yellowish brown).

Length: Body (without antenna and ovipositor) 13 mm; wing 13; fore basitarsus 1.5.

DISTRIBUTION: Ceylon.

Holotype ♂, Ceylon, 24. IV. 1923 (BMNH).

Paratype: 1♂, Ceylon, 23. IV. 1923 (BMNH); 1♀, same as type (BMNH).

19. *Rachicerus solivagus* Nagatomi, new species Fig. 47-49.

One ♂ from Thailand; shining blackish but in abdomen, segment 2 except median band, posterior border of segment 3 and that of tergum 4, in fore and mid legs basitarsus except apical part and tibia, and apical part of hind tibia and haltere pale yellowish brown, antenna 2+36-37 segmented; wing rather strongly tinged with dark brown; See couplet 31 of the key. This species is peculiar in the marking of abdomen.

♂. Head: Shining black; palpus and proboscis dark brownish but apical part of former yellowish brown; antenna shining blackish but in lower processes of flagellum entire surface of segment 1 and basal 1/2 of segments 2-5 yellowish brown; front with 2 pairs of grooves of which inner one runs at sides of median ocellus and outer one at opposite sides of ocellar tubercle; ocellar triangle, vertex, occiput, and cheeks pale pilose and palpus, proboscis, and antennal segments 1 and 2 black haired; width of front at broadest point longer than distance from antenna to median ocellus ($1.3 \times$) and 1.4 width of front at median ocellus which is 2.4 width of ocellar triangle; antenna 2+36 (in left antenna) or 2+37 (in the right) segmented, its total length about $7 \times$ distance from antenna to median ocellus, segment 1 somewhat wider than long ($1.3 \times$), longest ones of lower processes 2.3 as long as width of segment 2 (of antenna) and last segment of flagellum 1.9 as long as wide.

Thorax: Shining black, but humeral callus and upper margin of mesopleura yellowish brown and lateral-tip of scutellum and border-area between postscutellum and metapleura tinged with yellowish brown; mesonotum, scutellum, anterolower, upper and posterior parts of meso-, ptero- (below spiracle), and metapleura pale pilose and propleura black haired; metapleura intermixed with few black pile; haltere yellowish white.

Leg: Polished and dark brownish to blackish; in fore and mid legs basitarsus except apical part and tibia and in hind leg apical part of tibia pale yellowish brown (in yellowish part of hind tibia dorsal surface is larger in area than the ventral and is $0.4 \times$ length of tibia); coxa and tibia with pale hairs which become black on apex of former and blackish part of latter; femur with black hairs; hind coxa with a ventral process; relative length of segments of fore leg 163-157-100-33-24-15-24, of mid leg 184-190-93-33-22-12-22, of hind leg 245-269-112-45-25-13-24.

Wing: Membrane rather strongly tinged with dark brownish; basal portion of marginal cell paler; veins dark brown; thickening of costa practically ends beyond apex of R_5 .

Abdomen: Shining blackish with following pale yellowish parts: segment 2 except a median band, posterior band of segment 3 and that of tergum 4; in tergum 2 anterior margin of blackish part is located at anterior row of sensory pits and in sternum 2 at posterior row of the pits; abdomen above and below clothed with black hairs which become pale on yellowish

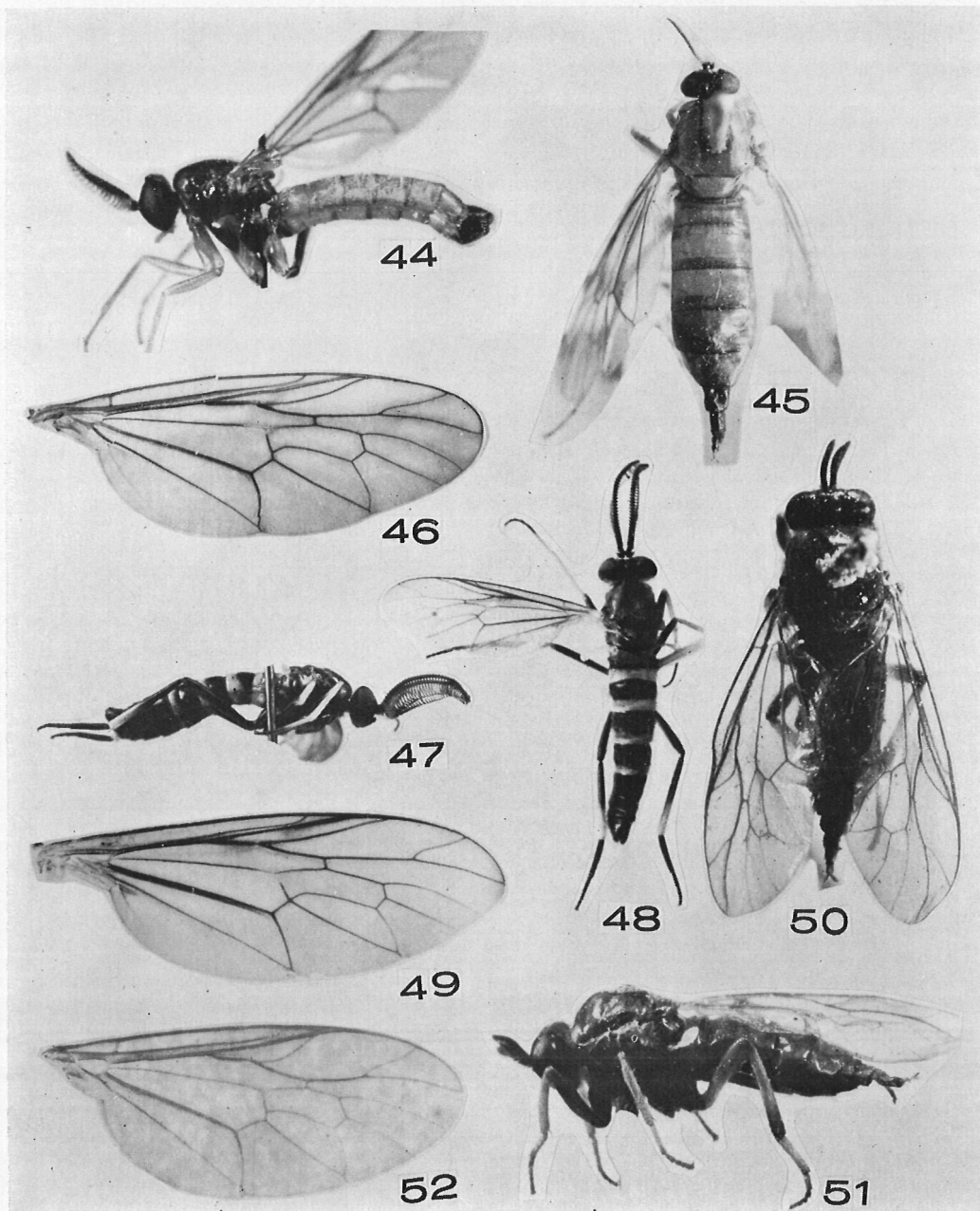


Fig. 44-46. *Rachicercus rusticus* n. sp. (44: ♂; 45-46: ♀). Fig. 47-49. *R. solivagus* n. sp., ♂.
 Fig. 50-52. *R. spissus* n. sp., ♀.

parts; tergum 1 with very short recumbent pile and with 2 transverse rows of long hairs; sternum 1 and anterior part of sternum 2 bare.

Length: Body (without antenna) 11.5 mm; wing 9; fore basitarsus 1.4.

♀. Unknown.

DISTRIBUTION: Thailand.

Holotype ♂, Chieng Dao, 70 km N of Chieng Mai, Thailand, 15. VI. 1965, Y. Miyatake (KU).

20. *Rachicerus spissus* Nagatomi, new species Fig. 50-52.

One ♀ from S. India; castaneous but leg with pale yellow-brown parts; wing faintly tinged with dark brown; antenna 2+15 segmented; see couplet 43 of the key. This species is probably separated from *pauciarticulatus* Frey of Philippines by having vein R_3 ending on R_{1+2} distinctly before wing margin.

♀. Head: Brownish to dark brownish (castaneous); palpus, proboscis, and antenna also castaneous; upper front, ocellar triangle, vertex, and upper occiput with pale hairs; lower occiput and cheeks with hairs which appear to be black; palpus, proboscis, and 1st 2 antennal segments black haired; front with a median distinct groove extending to median ocellus; eye at margin of front without shining black incision; whitish gray pollinose part of front very short in length; total width of head 2.2 width of front at broadest point which is somewhat longer than distance from antenna to median ocellus ($1.2 \times$) and width of front at median ocellus ($1.25 \times$) which is $2.8 \times$ width of ocellar triangle; antenna 2+15 segmented, its total length $2.1 \times$ distance from antenna to median ocellus, width of segment 1 somewhat narrower than its length ($0.7 \times$), longest ones of lower processes 1.7 as long as width of segment 2 (of antenna) and last segment of flagellum $2 \times$ as long as wide.

Thorax, leg, and abdomen: Brownish to dark brownish (castaneous), but humeral callus, haltere, tibia except less than apical 1/2 of hind pair, tarsus except apical portion, and hind femur except ca. apical 1/2 yellowish brown; mesonotum, scutellum, upper and posterior parts of mesopleura, femur, and tibia with pale pile which becomes black on ventral and apical parts of hind tibia; pile on pro- and metapleura is black and that on coxa and abdomen appears to be black also (ovipositor is pale pilose); hind coxa appears to have no mid-ventral process; relative length of segments of fore leg 221-267-100-32-21-18-43, of mid leg 236-232-93-36-21-18-39, of hind leg 317-346-132-54-25-18-43.

Wing: Membrane faintly tinged with dark brown; stigma not marked; veins dark brown; vein R_3 ending on R_{1+2} before wing margin; thickening of costa ending on just beyond apex of R_5 .

Length: Body (without antenna and ovipositor) 7.5 mm; wing 7.5; fore basitarsus 0.7.

♂. Unknown.

DISTRIBUTION: Ceylon.

Holotype ♀, Maskeliya, E. E. Green (BMNH).

21. *Rachicerus tenuiculus* Nagatomi, new species Fig. 53-54.

One ♀ from New Britain; yellowish brown but head, antennal flagellum except base and lower processes, a pair of stripes on mesonotum, posterior 1/2 of mesopleura, hind tibia except apical part, and base of abdominal tergum 1 and posterior margin of terga 2-4 dark brownish to blackish; wing tinged with dark brown; antenna 2+ probably 17 or nearly so segmented; vein M_2 rudimentary and vein R_3 ending on R_{1+2} before wing margin. See couplet 26 of the key. The 4 species, *tenuiculus*, *tenuis*, *bilineus*, and *omissinervis*, are closely related to, but are probably

distinguished from one another as shown in the key.

♀. Head: As in *tenuis* (head entirely shining blackish in *tenuiculus*) but in antennal flagellum, segment 3 (except lower process) blackish; antenna 2+ more than 13 segmented (probably 2+17 or nearly so; apical part of flagellum broken off).

Thorax: As in *tenuis*, but posterior part of mesonotum dark brownish to blackish.

Leg: As in *tenuis*, but hind tibia (except knee and apical 1/4-1/5) blackish and pile on this blackish part black; relative length of segments of fore leg 161-168-100-27-18-13-25, of mid leg 193-200-98-30-20-13-21, of hind leg 248-288-123-45-25-13-23.

Wing: As in *tenuis*.

Abdomen: As in *tenuis*, but pile on middle part of terga 1-4 black.

Length: Body (without antenna and ovipositor) 8 mm; wing 9; fore basitarsus 1.1.

♂. Unknown.

DISTRIBUTION: New Britain.

Holotype ♀ (BISHOP 6602), Gazelle Pen, Mt Sinewit, 7-16. XI. 1962, J. Sedlacek.

22. *Rachicerus tenuis* Nagatomi, new species Fig. 55-56.

Two ♀♀ from New Guinea; yellowish brown; head, apical part of antennal flagellum, a pair of stripes on mesonotum, basal part of abdominal tergum 1 and posterior margin of terga 2-4 dark brownish to blackish; wing faintly tinged with dark brown; antenna 2+16-17 segmented; vein M_2 rudimentary and vein R_3 ending on R_{1+2} before wing margin. See couplet 27 of the key. This species may be separated from *bilineus* Walker in which mesonotum with 1 black spot on each side in front in addition to a pair of stripes and abdomen with "a slender black band at the base."

♀. Head: Shining chestnut brown, but occiput except median occipital region, ocellar triangle, and sides of front shining black (in some individuals head except its appendages may be entirely shining black); palpus, proboscis, and antennal segments 1-2 yellowish brown and in antennal flagellum, which is 16-17 segmented, segments 1-3 (or 1-4) and lower processes on segments 1-11 (or 1-12) yellowish brown but remainder dark brownish; front with 2 pairs of longitudinal grooves running at opposite sides of ocellar triangle; face more or less pale gray pollinose; ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, and antennal segments 1-2 with yellow-brown hairs; width of front at broadest point equal to distance from antenna to median ocellus and 1.4-1.6 width of front at median ocellus which is 2.0-2.2× width of ocellar triangle; antenna 2+16 (in left antenna) or 2+17 (in the right) segmented, its total length 3.2 distance from antenna to median ocellus, segment 1 as wide as long, longest ones of lower processes somewhat longer than (1.3 ×) width of segment 2 (of antenna), and last segment of flagellum less than 2× (1.8 × in left antenna and 1.6 × in the right) as long as wide.

Thorax: Yellowish brown; mesonotum with 2 narrow blackish stripes extending neither anterior nor posterior margins of mesonotum; mesonotum, scutellum, pro-, upper part of meso-, and metapleura with yellowish brown pile which is longer on pro- and metapleura; haltere yellowish brown.

Leg: Yellowish brown; hairs on leg yellowish brown; hind coxa with a ventral process; relative length of segments of fore leg 156-160-100-28-19-13-21, of mid leg 181-192-104-32-19-11-19, of hind leg 226-272-125-49-21-12-21.

Wing: Membrane faintly tinged with dark brown, although 2nd submarginal cell, and apex of each of costal, subcostal, 1st submarginal, and 1st posterior cell are slightly darker; veins dark brown; vein M_2 rudimentary and vein R_3 ending on R_{1+2} before wing margin; thickening of costa ending beyond apex of M_1 .

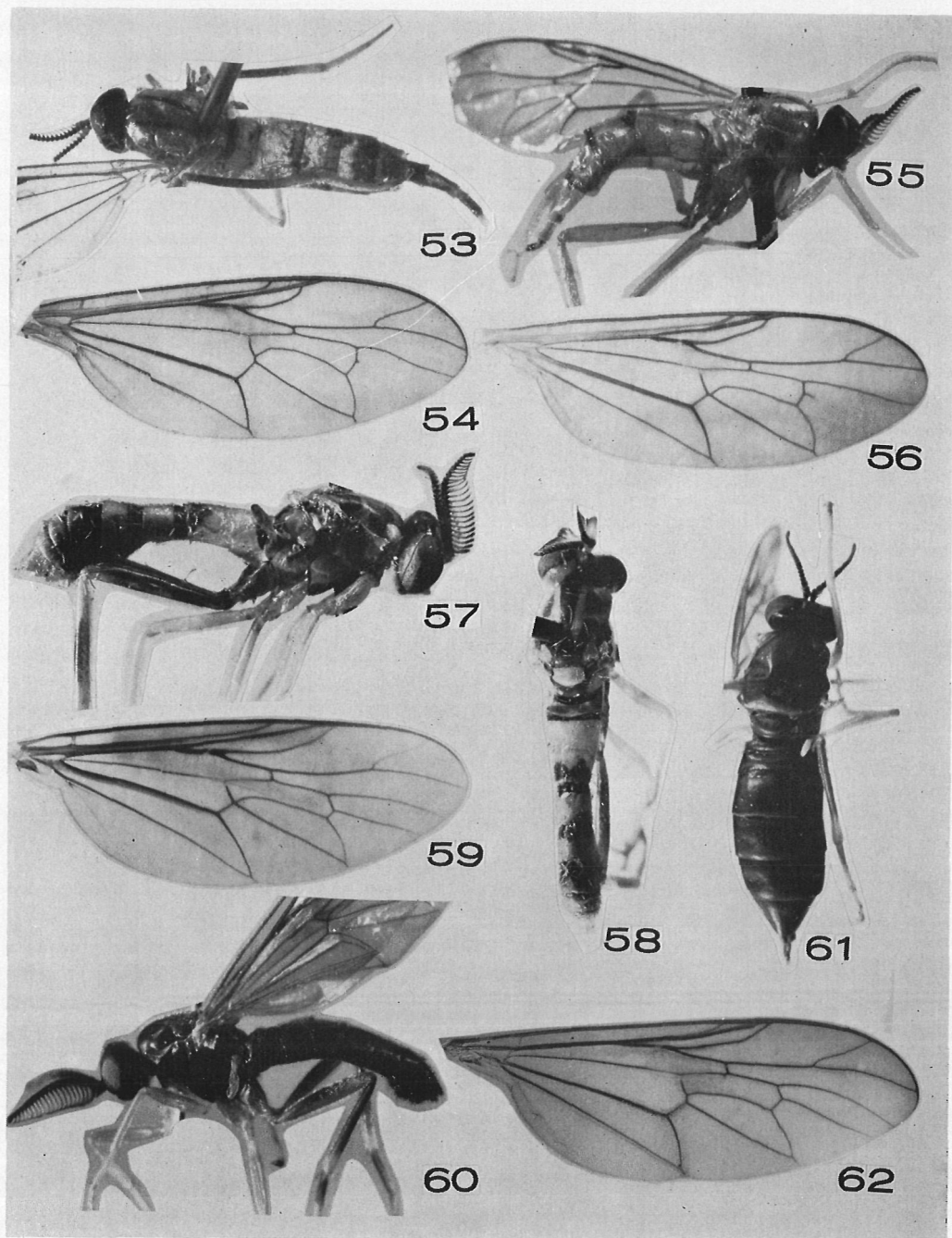


Fig. 53-54. *Rachicerus tenuiculus* n. sp., ♀. Fig. 55-56. *R. tenuis* n. sp., ♀. Fig. 57-59. *R. tigrinus* n. sp., ♂. Fig. 60-62. *R. galloisi* Séguy (60: ♂; 61-62: ♀).

Abdomen: Yellowish brown, but base of tergum 1 and apex of each terga 2-4 with narrow blackish band which does not extend to sides of segment; segment 8 blackish; abdomen above and below with yellowish brown pile.

Length: Body (without antenna and ovipositor) 6 mm; wing 7; fore basitarsus 1.1.

♂. Unknown.

DISTRIBUTION: New Guinea.

Holotype ♀ (BISHOP 6603), Vogelkop, Manokwari, 27. VII. 1957, D. E. Hardy.

Paratype: 1 ♀, Star Mts., Sibil Val., NW New Guinea, 18. X-8. XI. 1961, S. and L. Quate (BISHOP).

In the paratype (whose mid and hind legs, and last segment of fore tarsus are missing and whose wings are broken off), the head is entirely shining black and front has only 1 pair of grooves running at the opposite sides of ocellar triangle.

23. *Rachicercus tigrinus* Nagatomi, new species Fig. 57-59.

One ♂ from N. Borneo; yellowish brown; thorax and abdomen with dark brownish to blackish parts as shown in fig. 57-58; antennal flagellum except more than basal 1/2 of lower processes dark brownish; tarsus and in hind leg coxa, femur, and tibia darkened; wing faintly tinged with yellowish brown; antenna 2+22-23 segmented. See couplet 18 of the key. This species is very peculiar in the marking of thorax and of abdomen.

♂. Head: Shining yellowish brown, but ocellar tubercle, cerebrale, and occiput around neck dark brownish; palpus and proboscis are yellowish brown but latter may have a dark brownish tinge; antenna yellowish brown but flagellum except basal parts of lower processes dark brownish; in antennal flagellum, segments 1-5 (or 1-6) may have a yellowish brown tinge and basal parts of lower processes on segments 1-18 (or 1-19) are yellowish brown (yellow-brown basal part is larger than dark brown apical one); front just above antenna and face with pale gray pollen which may not be so conspicuous; ocellar triangle, vertex, occiput, cheeks, palpus, and antennal flagellum pale pilose and proboscis chiefly black haired; antennal segments 1-2 intermixed with pale and black hairs; width of front at broadest point about equal to $(1.1 \times)$ distance from antenna to median ocellus and 1.2 width of front at median ocellus which is 2.3 width of ocellar triangle; antenna 2+23 (in left antenna) or 2+22 segmented (in the right), its total length 3.9 distance from antenna to median ocellus, segment 1 as wide as long, longest ones of lower processes about 2.5 width of segment 2 (of antenna), and last segment of flagellum $3 \times$ as long as wide.

Thorax: Yellowish brown, with following dark brownish to blackish parts: in mesonotum 3 very distinct, broad stripes of which median one extends to either anterior or posterior margins of mesonotum and lateral ones, which begin just behind humeri and connect with median stripe at posterior border of mesonotum, are broadly interrupted near middle and leave a large, yellowish brown spot opposite base of wing, and in pleura posterior 1/2 of mesopleura, a border of sternopleura from behind fore coxa to before mid coxa, upper 1/2 of pteropleura, and narrow area before, above, and below posterior spiracle; postscutellum dark brownish and pteropleura above mid coxa with a dark brownish tinge; mesonotum, scutellum, pro-, antero-lower and postero-upper parts of meso- and metapleura with pale yellowish pile which is longer on pro- and metapleura; haltere yellowish brown (knob may be somewhat darker).

Leg: Yellowish brown, but tarsus especially last 4 segments darkened and in hind leg coxa (except apical part), femur (except apical part), and tibia especially at middle (except basal part) strongly tinged with dark brownish; pile on leg pale yellowish; hind coxa with a ventral process; relative length of segments of fore leg 163-172-100-27-20-13-23, of mid leg 195-193-108-

30-17-12-23, of hind leg 250-277-133-42-20-12-22.

Wing: Membrane faintly tinged with yellowish brown; stigma not marked; veins dark brown; thickening of costa ending beyond apex of M_2 .

Abdomen: Yellowish brown, with following blackish parts: a pair of spots on posterior part of tergum 2 (these spots are triangular in shape and produced forward and their inner-basal corners are connected with each other and outer basal ones do not extend to lateral margins of segment), basal bands on terga 3-5 which extend to lateral margins of segments and are gradually larger in area posteriorly, and basal parts of terga 6 and 7; tergum 1 with a black apical band of dense, very short hairs; abdomen above and below clothed with short black hairs, but a transverse row of long, pale yellowish pile present just before and behind apical black band of tergum 1 respectively, tergum 7 except sides and genitalia short pale pilose, and sterna 1 and 2 bare.

Length: Body (without antenna) 10 mm; wing 9; fore basitarsus 1.2.

♀. Unknown.

DISTRIBUTION: Sabah (N. Borneo).

Holotype ♂ (BISHOP 6604), N of Kalabakan, 28.X.1962, K. J. Kuncheria.

24. *Rachicerus varius* Nagatomi, new species Fig. 1.

Three ♂♂ from Thailand; yellowish brown, but head shining black, and pleura, abdomen, and leg with dark brownish to blackish parts which are variable in area on former 2; wing tinged with dark brownish and with some darker parts; antenna 2+27-28 segmented; See couplet 17 of the key. This species is most closely related to *nigricornis* Brunetti but may be separated from the latter by the marking of abdomen.

♂. **Head:** Shining black; palpus, proboscis, and antennal segments 1 and 2 yellowish brown; flagellum except lower processes blackish but last 5-6 segments pale yellowish brown, and lower processes yellowish brown (but on segments 3-20 bases and apices dark brownish) or dark brownish (but on last 5 segments entire surfaces pale yellowish brown and on segments 1-2 almost entire surfaces yellowish brown); front with some indistinct grooves; ocellar tubercle, vertex, occiput, cheeks, palpus, proboscis, and antennal segments 1-2 with yellow-brown pile which is intermixed with black one on last mentioned one; width of front at broadest point about equal to distance from antenna to median ocellus ($1.1 \times$) and 1.2-1.3 width of front at median ocellus which is 2.2-2.8 width of ocellar triangle; antenna 2+27-28 segmented (in 2 of 3 specimens distal part of antenna is broken off), its total length $6 \times$ distance from antenna to median ocellus, segment 1 somewhat wider than long ($1.2 \times$), longest ones of lower processes about 2.5 as long as width of segment 2 (of antenna) ($2.3-2.6 \times$), and last segment of flagellum nearly $2 \times$ as long as wide ($1.8 \times$).

Thorax: Yellowish brown, but mesopleura except anterior part and hypopleura dark brownish to blackish, and pteropleura near middle (1) and at lower part (2), metapleura at middle (3), and sternopleura (4) also dark brownish, although sometimes (2), (3), and lower and posterior parts of (4) without a dark brownish tinge; mesonotum with short, sparse, yellowish brown pile and posterior border of scutellum with some black hairs; pro-, upper and posterior parts of meso-, and anterior part of metapleura yellowish brown haired; haltere yellowish brown.

Leg: Yellowish brown, but trochanter and tarsus except fore and mid basitarsi (sometimes including segment 2) and in hind leg entire surface or basal part of coxa, tibia except apical part (which is variable in size but less than $1/2$ length of tibia in specimens at hand), and tibia except base and apical part (which is nearly or less than $1/2$ length of tibia) dark brownish to blackish; sometimes base of mid tibia with a dark brownish tinge; coxa, tibia, and femur pale pilose; hind coxa with a ventral process; relative length of segments of fore leg

176 (173-181): 173 (168-176): 100: 30 (30): 21 (20-22): 15 (14-16): 27 (27-28), of mid leg 202 (198-205): 198 (193-202): 93 (89-97): 33 (32-35): 22 (21-23): 15 (14-16): 26 (25-27), of hind leg 259 (255-262): 282 (279-284): 123 (122-123): 46 (43-49): 25 (23-27): 16 (16): 28 (25-30), these were calculated from 3 specimens.

Wing: Membrane tinged with dark brownish; costal, apex of subcostal, marginal (except apex and basal part), and 1st basal cell darker and a region from stigma to base of discal cell slightly so; veins dark brownish; thickening of costa practically ending beyond apex of R_5 .

Abdomen: Yellowish brown, but following parts dark brownish to blackish: (1) tergum 1, (2) tergum 5, (3) basal part of tergum 4 which does not extend to lateral margin and is produced in middle but not reaching to posterior margin, (4) basal part of sternum 5 which is interrupted in middle, (5) narrow basal part of tergum 6, and (6) tergum 9 except basal and median parts, although sometimes (3), (4), (5), and apical and lateral parts of (2) remain to be yellowish brown; abdomen with black pile which becomes yellowish brown on sterna 2-5 and sides of terga 2-4 (or 2-5) (sternum 1 bare).

Length: Body 6-8 mm; wing 5.5-6.5; fore basitarsus 0.75-0.9.

♀. Unknown.

DISTRIBUTION: Thailand.

Holotype ♂, Chiang Dao, 70 km N of Chiang Mai, Thailand, 15. VI. 1965, Y. Miyatake (KU).

Paratypes: 2 ♂♂, same data as holotype (KU).

25. **Rachicerus galloisi** Séguy, 1948: 154, fig. 1. Fig. 60-62.

Two ♂♂ and 1 ♀ from Japan; dark brownish to blackish; lower processes of antennal flagellum, proboscis, haltere, and leg (hind leg with a dark brownish tinge) yellowish brown; wing faintly tinged with dark brown; antenna 2+18-21 segmented. See couplet 49 of the key.

♂. **Head:** Shining black; palpus brownish to dark brownish, and proboscis yellowish brown to brownish; antennal segments 1-2 dark brownish to blackish and shining, flagellum dark brownish but lower processes yellowish brown; front with 7, somewhat indistinct longitudinal grooves of which outer 4 (2 pairs) run at opposite sides of ocellar triangle but remaining 3 (central one and a pair of lateral ones) appear to be not extending to median ocellus; ocellar triangle, vertex, occiput, and cheeks pale pilose; palpus, proboscis, and 1st 2 antennal segments with black hairs which are longer on the last mentioned one; width of front at broadest point somewhat longer than distance from antenna to median ocellus (1.2 ×) and 1.4-1.5 width of front at median ocellus which is 2.0-2.2 width of ocellar triangle; antenna 2+18-20 segmented, its total length 4.3-4.4 distance from antenna to median ocellus, segment 1 as wide as or wider than (1.0-1.3 ×) long, longest ones of lower processes 2.0-2.3 as long as width of segment 2 (of antenna), and last segment of flagellum $1\frac{1}{2}$ -2 × as long as wide.

Thorax: Shining black; humeral callus and upper margin of pleura pale brownish; thorax may have a brownish tinge especially on posterior portion of mesonotum and that of scutellum, pteropleura, etc., mesonotum, scutellum, pro-, central part of sterno-, antero-lower, upper and posterior parts of meso-, ptero- (just below spiracle), and metapleura with pale yellowish pile which is longer on pro- and metapleura; haltere yellowish brown.

Leg: Yellowish brown, but in hind leg tibia except apical portion dark brownish to blackish and femur except base, apex, and ventral part, and basitarsus at base with a dark brownish tinge; hairs on leg pale yellowish; hind coxa with a ventral process; relative length of segments of fore leg 186 (184-187): 178 (174-182): 100: 33 (32-33): 25 (24-26): 18 (17-18): 30 (29-31), of mid leg 208 (205-210): 199 (195-203): 90 (87-92): 35 (33-37): 24 (23-24): 17 (16-

18): 29 (28-29), of hind leg 256 (254-258): 277 (276-277): 120 (118-121): 50 (46-53): 28 (26-29): 18 (18): 32 (31-32), these were calculated from 2 specimens.

Wing: Membrane faintly tinged with dark brown; veins dark brown; thickening of costa becomes very narrow beyond apex of R_5 and ends beyond apex of M_2 .

Abdomen: Shining dark brownish to blackish; anterior portion of tergum 1 may have a brownish tinge and that of sternum 2 are sometimes yellowish brown; abdomen above and below with black pile.

Length: Body (without antenna) 7 mm; wing 6.5; fore basitarsus 0.8.

♀. Similar to ♂ except as follows: Longest ones of lower processes of antennal flagellum as long as width of antennal segment 2 (in specimen on hand antenna 2+21 segmented and 3.7 as long as distance from antenna to median ocellus, segment I, 0.9 as wide as long, and last segment of flagellum 1.3 as long as wide); relative length of segments of fore leg 190-182-100-33-25-16-31, of mid leg 218-214-100-35-22-16-29, of hind leg 269-300-127-49-31-18-31.

Length: Body (without antenna and ovipositor) 8.5 mm; wing 9; fore basitarsus 1.0.

DISTRIBUTION: Japan (Honshu and Kyushu).

Type-locality: Chûzenji, Honshu, Japan. I studied the types (1♂, 1♀) which are deposited in Muséum National d'Histoire Naturelle, Paris.

SPECIMENS EXAMINED: 1♂, 1♀, Kirishimayama, Hyûga (Miyazaki-Pref., Kyushu), 23.

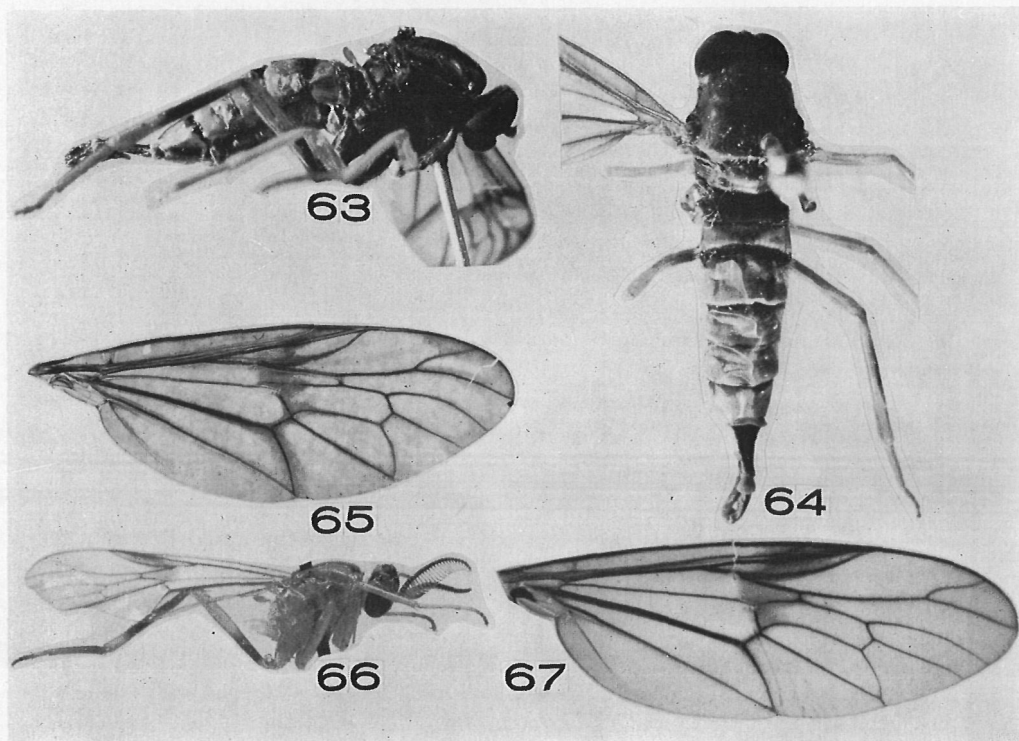


Fig. 63-65. *Rachicerus patagiatus* Enderlein, ♀. Fig. 66-67. *R.* sp. (sex is unknown).

VII. 1962, A. Nagatomi (KA. U) ; 1 ♂, Mt Daisen, Hôki (Tottori-Pref., Honshu), 23.VII. 1946, S. Osada (KA. U).

26. *Rachicerus patagiatus* Enderlein, 1913 : 538, fig. 3. Fig. 63-65.

There is a ♀ specimen which seems to belong in *patagiatus* Enderlein and the redescription based on this individual is given below.

♀. Head (antennal flagellum is broken off): Shining and reddish brown but upper portion of front, occiput except cerebrale, and cheeks dark brownish to blackish and front just above antenna and face tinged with blackish; palpus, proboscis, and antennal segments 1-2 yellowish brown (outer surface of antennal segment 1 may have a dark brownish tinge); front with 2 pairs of grooves running at opposite sides of ocellar triangle of which outer one may disappear at lower part of front; ocellar triangle, vertex, occiput, cheeks, palpus, proboscis, and antennal segments 1-2 yellowish brown haired; total width of head about $6 \times$ width of face at lowest portion from a direct frontal view; width of front at broadest point about equal to distance from antenna to median ocellus ($1.1 \times$) and 1.3 width of front at median ocellus which is 2.2 width of ocellar triangle; antennal segment 1 somewhat wider than long ($1.2 \times$).

Thorax: Yellowish brown; mesonotum may have 2 indistinct blackish longitudinal stripes; meso-, antero-lower part (between fore and mid coxae) of sterno-, lower part of pteropleura, and postscutellum with a dark brownish tinge; mesonotum, scutellum, pro-, antero-lower, upper and posterior parts of meso-, meta-, and pteropleura (below spiracle) yellowish brown pilose; haltere yellowish brown.

Leg: Yellowish brown, but in hind leg coxa, trochanter, basal about 1/2 of femur may have a dark brownish tinge and tibia except base and apical nearly 1/3 may be dark brownish; leg yellowish brown pilose; hind coxa with a ventral process; relative length of segments of fore leg 161-161-100-30-20-13-25, of mid leg 198-187-95-30-21-14-23, of hind leg 235-263-116-43-23-?-?.

Wing: Membrane tinged with yellowish brown, but apical part of subcostal cell and a region from stigma to base of 4th posterior cell darker and apical (before apex of R_4) and posterior margins of wing and most of veins bordered with dark brown; thickening of costa practically ending beyond apex of R_5 .

Abdomen: Yellowish brown, but tergum 1, anterior margins of terga 3-5, and a median band of tergum 2 (which is located at the transverse row of sensory pits) dark brownish to blackish and ovipositor with a dark brownish tinge; abdomen above and below yellowish brown haired.

Length: Body (without antenna and ovipositor) 12.5 mm; wing 14; fore basitarsus 1.8.

♂. Unknown.

DISTRIBUTION: Taiwan.

Type-locality: Hoozan. Type in "Deutschen Entomologischen Museum".

SPECIMEN EXAMINED: 1 ♀, Chipon, Taito, 16.V.1921, T. Shiraki (NTU).

27. *Rachicerus* sp. Fig. 66-67.

One specimen from Viet Nam, whose abdomen is entirely broken off, seems to represent a new species but is not named here. This species appears to be most closely related to *maai* n. sp. but may be differentiated from the latter by having the following characters: basal part of hind femur dark brownish to blackish; head yellowish brown but ocellar triangle and a region just behind it dark brownish to blackish; apex of costal cell darkened; total width of head $3.5 \times$ width of face at lowest portion from a direct frontal view, rather than $5-6 \times$.

(Sex is unknown). Head: Yellowish brown but ocellar tubercle and a region just behind it

dark brownish to blackish; palpus, proboscis, and antenna yellowish brown but flagellum except lower processes dark brownish (flagellar segments 1-3 or some more with a yellowish brown tinge and apices of lower processes with a dark brownish tinge); front with a pair of grooves running at opposite sides of ocellar triangle and a groove extending to median ocellus; occiput, cheeks, palpus, proboscis, and antennal segments 1 and 2 with yellow-brown hairs but ocellar tubercle and a region just behind it with black ones; total width of head about 3.5 width of face at lowest portion from a direct frontal view; width of face at broadest point somewhat longer than distance from antenna to median ocellus ($1.2 \times$) and 1.35 width of face at median ocellus which is 2.1 width of ocellar triangle; antenna 2+27 segmented, its total length $5 \times$ distance from antenna to median ocellus, segment 1 wider than long ($1.5 \times$), longest ones of lower processes 2.1 width of segment 2, and last segment of flagellum $3 \times$ as long as wide.

Thorax: Yellowish brown; mesonotum with 1 pair of blackish longitudinal stripes which begin at inner margin of humeral callus and may be connected with each other before scutellum (an area just before posterior border and between stripes becomes darker); mesonotum and scutellum with black pile which becomes yellowish brown on lateral part of former (including humeri); pro-, antero-lower and upper parts of meso-, hypo- (below spiracle), and metapleura yellowish brown haired; haltere yellowish brown.

Leg: Yellowish brown, but apical 2-3 tarsal segments somewhat darkened and in hind leg basal part of femur (which is less than $1/2$), tibia except apical part (which is about $1/4$) and knee, and basal portion of basitarsus dark brownish to blackish; leg with yellow-brown pile which may become partially blackish on blackish part of hind tibia; hind coxa with a ventral process; relative length of segments of fore leg 146-160-100-30-18-12-22, of mid leg 172-170-100-30-18-10-22, of hind leg 250-274-134-44-20-12-22.

Wing: Membrane faintly tinged with dark brown (costal and 1st basal cell somewhat yellowish); apical part of costal and that of subcostal cell, stigma, and a region from stigma to base of 4th posterior cell distinctly darkened; veins dark brownish; thickening of costa becomes very narrow beyond apex of R_5 and ends beyond apex of M_2 .

Abdomen: Entirely broken off in specimen at hand.

Length: Body?; wing 11 mm; fore basitarsus 1.6.

DISTRIBUTION: Viet Nam.

SPECIMEN EXAMINED: 1, Dalat, 9. VI.-7. VII, 1961, N. R. Spencer (BISHOP).

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