

A systematic study of the genus *Cavillatrix* Richter (Diptera, Tachinidae)

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A systematic study of the genus *Cavillatrix* Richter (Diptera, Tachinidae)*

Hiroshi SHIMA**

Keywords: Systematics, new species, Insecta, Diptera, Tachinidae.

Abstract: The genus *Cavillatrix* is revised and its systematic position is discussed: it comprises 13 species which are distributed in areas from the Far East to South Pacific; the genus is considered belonging to the tribe Leskiini. Ten new species are described: *C. bukidnon* sp. n. from Mindanao, *C. equatorialis* sp. n. from Singapore, *C. gymnops* sp. n. from Japan, *C. similis* sp. n., *C. palpis* sp. n. and *C. papuana* sp. n. from New Guinea, *C. antennalis* sp. n., *C. curtichela* sp. n. and *C. fijiana* sp. n. from Fiji and *C. intermedia* sp. n. from Vanuatu. A new combination is proposed: *C. plumifera* (Bezzi) comb. n.

I. Introduction

The genus *Cavillatrix* was erected by Richter (1986) as monotypic with the type species *Cavillatrix calliphorina* Richter, 1986, from Primorye, Far East Russia. Shima & Chao (1992) described the second species of this genus from Yunnan, southwest China, and mentioned that there still remained some more species undescribed from Japan, Southeast Asia and South Pacific areas. This paper reports the result of my recent systematic study of the material from the areas mentioned by Shima & Chao (l.c.). In the following pages I treat 13 species belonging to the genus, 10 of which are described as new to science.

The geographical distribution of this genus is rather curious. It is found in scattered localities from the Eastern Palearctic Region to South Pacific areas. This genus seems to be diverse in New Guinea and Fiji, but only a few species are found in Southeast Asia. Adults of *Cavillatrix* occur in mid to late summer in Japan and China and they usually fly around leaves of high trees, so it is difficult to find them. It is expected that more species of this genus will be found in east to southeast Asia when the region is surveyed in more detail. Hosts of this genus are unknown. It is possible that hosts are one of the factors restricting the geographical distribution

of the genus to the Far East, Southeast Asia and South Pacific areas.

II. Material and methods

Material was studied from the following collections:

Biosystematics Laboratory, Graduate School of Social and Cultural Studies, Kyushu University, Fukuoka (BLKU).

Department of Entomology, Natural History Museum, London (BMNH).

Department of Natural Sciences, Bishop Museum, Honolulu (BISHOP).

Institute of Zoology, Academy of Sciences, St. Petersburg (IZAS).

Kunming Institute of Zoology, Academia Sinica, Kunming (KIZ).

Terminology mainly follows McAlpine (1981) and measurements follow Shima (1984). In the male of some species the frons becomes very narrow in front of ocellar triangle and then widened toward vertex. In this case the narrowest part of the frons was measured in dorsal view. The distance between the bend of the wing vein M and wing margin was measured in direct extension along vein M from its bend to the wing margin. The following abbreviations are adopted for thoracic chaetotaxy:

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acr: acrostichal setae dc: dorsocentral setae

ia: intra-alar setae

For the position of leg setae the following abbreviations are used:

ad: anterodorsal d: dorsal p: posterior

pd: posterodorsal pv: posteroventral v: ventral

III. Systematics

1. Genus *Cavillatrix* Richter

Cavillatrix Richter, 1986, Trud. zool. Inst. SSSR, 146:

98. Type species: *Cavillatrix calliphorina* Richter, 1986, by original designation.

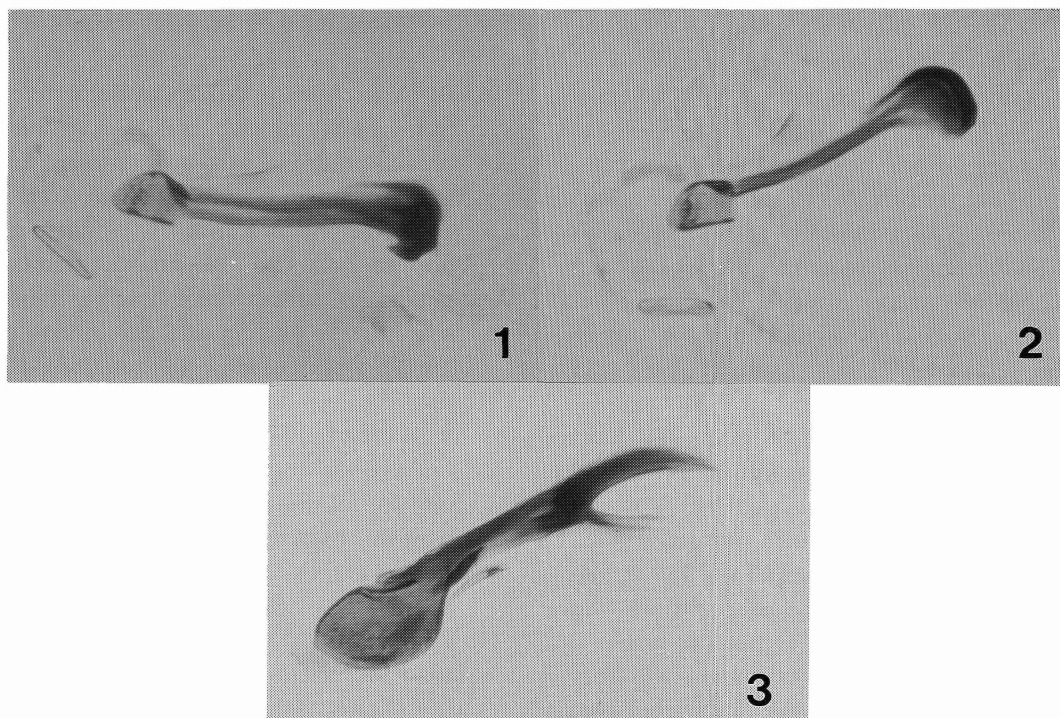
Male and female. Head dichoptic, frons sometimes very narrow in male; face projected forward on lower margin, well visible in profile; parafacial bare, narrowed below; gena narrow; facial ridge at most with several fine setae on lower 1/4; inner vertical seta usually very weak in male, always strong and usually converging apically in female; outer vertical seta usually absent in male, present in female; prevertical seta usually absent in male, always present in female; reclinate orbital setae absent; proclinate orbital seta usually absent in male, always present in female; prementum shorter than eye height; labium usually open dorsally; palpus slender, at most weakly widened at apex; antenna falling short of lower margin of face; pedicel with a long seta which is longer than its own length; arista long plumose, its width including plumosity usually more than width of 1st flagellomere; eye bare or densely hairy. Thorax including scutellum black in ground color; prosternum haired; proepisternum bare; postpronotal lobe with 3 setae, middle seta slightly set forward; 2+1-2 acr; 3+3 dc; 0+2-3 ia; 3 supra-alar setae; 2+1 katapisternum setae, katapisternum haired in front of mid coxa; anepimeral seta developed; katepimeron bare; anatergite with minute hairs; scutellum usually with 3 pairs of marginal setae, lateral seta usually absent, apical pair of setae strong, crossing each other horizontally. Wing at most weakly tinged with pale brown; tegula and basicosta black; 2nd costal sector bare above and below; basal node of vein R₄₊₅ with several fine hairs dorsally and ventrally; bend of vein M distinctly closer to wing margin than to dm-cu crossvein; last section of vein CuA₁ distinctly shorter than dm-cu crossvein; vein A₂ not reaching wing margin. Legs with femora sometimes reddish in female; fore tibia usually with 1 p seta; mid tibia with 1-2 ad, 2 pd and 1 v setae; hind tibia with a sparsely set row of ad and 1-2 v setae, without submedian pd seta, with 2 preapical d setae and without apical pv seta. Abdomen ovate to long ovate; mid dorsal excavation of syntergum 1+2 extending to posterior margin; syntergum 1+2 without median marginal seta; 3rd

tergum with or without median marginal seta; 4th and 5th terga each with a row of marginal setae; discal setae absent; 2nd to 4th sterna each with a pair of strong marginal setae. Male genitalia: 6th tergum entire, free from synsternum 7+8, with or without hair; dorsal arms of hypandrium fused with each other and strongly articulated with basilliform sclerites; gonopod with several hairs posteriorly; paramere long; epiphallus narrow and long; distiphallus rather elongate and flattened, dorsal portion broadly membranous; ejaculatory apodeme large. Female genitalia: very short; 6th tergum short, divided into 2 hemitergites; 6th and 7th spiracles both in 6th hemitergite; 7th tergum of small hemitergites and weakly sclerotized or completely absent; 8th tergum absent; 8th sternum rather broad, rounded apically; epiproct present.

2. Systematic position of *Cavillatrix*

The genus *Cavillatrix* was considered as a member of the tribe Leskiini by Richter (1986) and the assignment was supported by Shima & Chao (1992). Mesnil (1973) defined the subtribe Leskiina (= Leskiini of Herting, 1984) by the combination of some external characters. Shima (1983) mostly followed Mesnil (l.c.) in the treatment of the Leskiini and mentioned Oriental and Palearctic genera included in the tribe. I consider the simultaneous presence of two characters, the forwardly projected lower margin of face and the presence of a pair of strong marginal setae on 2nd to 4th abdominal sterna, as important diagnostic characters of the Leskiini. Although the genus *Cavillatrix* is characterized by a rather curious combination of characters, such as long plumose arista, long and strong seta on the pedicel and haired prosternum, it also shares the above two characters. The plumose arista and strong seta on the pedicel are also found in some other genera of the Leskiini. The male genitalia of *Cavillatrix* are characterized by the entire and free 6th abdominal tergum, fused dorsal arms of the hypandrium, elongate and flattened distiphallus and large ejaculatory apodeme. These character states are also found in some genera of Leskiini and seem to support the assignment of this genus to the tribe. First instar larvae of members of *Cavillatrix* have a peculiar rounded anterior apex of the cephalopharyngeal skeleton (probably the labrum, Wood, 1987)(Figs. 1, 2). This character state is also found in some other members of Leskiini including *Leskia* (Fig. 3; cf. Figs. 25, 26 of Thompson, 1963, Fig. 239 of Cantrell, 1988) and it may also be a diagnostic character of this tribe. In these respects I confirm that *Cavillatrix* belongs to the tribe Leskiini of the subfamily Tachininae.

Shima (1983) classified Oriental and Palearctic



Figs.1–3. Cephalopharyngeal skeleton of 1st instar larva. 1. *Cavillatrix curtichela* sp. n.; 2. *C. fijiana* sp. n.; 3. *Leskia aurea* (Fallén).

genera of the Leskiini into two groups based on the structure of the male and female genitalia. The male and female genital structures of *Cavillatrix* members seem to conflict with this grouping. The phylogenetic relationships among leskiine genera need to be considered as a world basis. The consideration of the phylogenetic position of *Cavillatrix* within the tribe is left for further study.

3. Key to species of *Cavillatrix*

1. Eye densely haired2
 - Eye bare, at most very sparsely short-haired.....6
2. Abdomen broadly reddish yellow at least on lateral portion of 3rd and 4th terga; 2+1 acr setae3
 - Abdomen entirely black in ground color; 2+2 acr setae4
3. Palpus long and cylindrical, only slightly shorter than 1st flagellomere; abdomen black on mid-dorsal longitudinal area of 3rd tergum, posterior 4/5 of 4th and entire 5th *papuana* sp. n.: Papua New Guinea (New Guinea)
 - Palpus short, only slightly longer than pedicel; abdomen broadly reddish yellow, narrow mid dorsal portion of 3rd tergum, posterior triangular portion of 4th tergum and entire 5th shining brown-black*palpis* sp. n.: Papua New Guinea (New Guinea)
4. Abdomen thinly and evenly whitish pollinose on entire dorsum; legs black with tibiae yellowish in male, yellow except tarsi in female
 -*calliphorina* Richter: Russia (Primorye)
 - Abdomen thinly whitish pollinose only on narrow anterior portion of 3rd and 4th terga and on anterior 1/3–1/2 of 5th tergum; leg color variable5
5. Legs yellow except tarsi in male; male frons very narrow, about as wide as anterior ocellus at the narrowest point
 -*luteipes* Shima et Chao:China (Yunnan)
 - Legs brown-black in male; male frons slightly wider, at least 2 times as wide as anterior ocellus at the narrowest point
 -*bukidnon* sp. n.: Philippines (Mindanao)
6. Males (male of *plumifera* and *equatorialis* unknown)7
 - Females (female of *intermedia* unknown)12
7. Legs black; proclinate orbital setae absent; inner vertical seta fine hair-like, not much longer than upper occipital setae8
 - At least mid and hind femora reddish yellow, apices darkened; tibiae black; proclinate orbital setae present or absent; inner vertical seta variable10
8. Fifth abdominal tergum black in ground color and evenly yellowish white pollinose
 -*fijiana* sp. n.: Fiji (Viti Levu)
 - 5th abdominal tergum broadly reddish brown, at most transversely darkened on posterior portion, thinly yellowish white pollinose on anterior por-

- tion9
9. Antenna with 1st flagellomere 3-3.5 times as long as pedicel; trochanters reddish yellow
*similis* sp. n.: Indonesia (Irian Jaya), Papua New Guinea (New Guinea)
 - 1st flagellomere 4-4.5 times as long as pedicel; trochanters dark brown except for reddish apices
*gymnops* sp. n.: Japan (Kyushu, Ryukyus)
10. 1-2 proclinate orbital setae present; coxae and basal 1/2 of all femora reddish; inner vertical seta strong, well distinguishable from upper postocular setae11
 - Proclinate orbital seta absent; fore coxa and femur dark brown; inner vertical seta fine hair-like, not distinguishable from upper postocular setae*intermedia* sp. n.: Vanuatu
11. Medium-sized species (6.5-6.8 mm); abdomen broadly dark brown, anterolateral portion of 3rd and 4th terga and narrow apex of 5th tergum reddish; antenna long, 1st flagellomere about 5 times as long as pedicel; claws and pulvilli very long*antennalis* sp. n.: Fiji (Viti Levu)
 - Smaller species (at most about 5 mm); abdomen broadly reddish brown, mid dorsal portion of 3rd tergum and posterior portion of 4th darkened; 1st flagellomere about 4.5 times as long as pedicel; claws and pulvilli short, fore claw and pulvillus shorter than 5th tarsomere
*curtichela* sp. n.: Fiji (Viti Levu)
12. Abdomen broadly brown-black in ground color, 5th tergum black except narrow reddish apex and rather densely whitish or dull yellowish white pollinose on dorsum13
 - Abdomen broadly reddish brown in ground color, posterior portion of each tergum sometimes darkened, 5th tergum reddish except for dark apex14
13. Abdominal dorsum almost entirely black in ground color except apex; dorsum of 3rd and 4th abdominal terga velvety black, very narrowly pollinose on each side, 5th tergum rather densely whitish pollinose
*antennalis* sp. n.: Fiji (Viti Levu)
 - Anterolateral portion of 3rd and 4th abdominal terga narrowly reddish, 3rd and 4th terga thinly dull yellowish white pollinose on anterior portion, 5th tergum densely dull yellowish white pollinose*fijiana* sp. n.: Fiji (Viti Levu)
14. 2+2 acr setae; abdomen entirely reddish yellow except mid dorsal excavation of syntergum 1+2, thinly whitish pollinose on narrow anterior portion of 3rd to 5th terga; legs black
*equatialis* sp. n.: Singapore
 - 2+1 acr setae; abdomen more or less darkened on posterior portion of each tergum; legs with femora reddish at basal 1/2 or more15
15. Vertex slightly less than 0.2 of head width16
 - Vertex about 0.22 of head width
*curtichela* sp. n.: Fiji (Viti Levu)
16. Black portion of distal 1/2-3/5 of femora distinct from basal reddish yellow portion; abdomen broadly reddish yellow in ground color except narrow mid dorsal longitudinal area of 3rd and 4th terga and posterior 1/3 of 4th and 5th terga; dorsum of 3rd abdominal tergum without pollinosity, 4th tergum thinly whitish pollinose on anterior portion and 5th rather densely yellowish white pollinose on anterior portion17
 - Femora only narrowly darkened at apices; abdomen broadly darkened on posterior portions of 3rd and 4th terga and mid dorsal portion of 5th; dorsum of 3rd and 4th abdominal terga thinly whitish pollinose on anterior portion, 5th rather densely whitish pollinose
*plumifera* (Bezzi): Fiji (Viti Levu)
17. Antenna with 1st flagellomere about 3 times as long as pedicel*similis* sp. n.: Indonesia (Irian Jaya), Papua New Guinea (New Guinea)
 - 1st flagellomere about 4 times as long as pedicel*gymnops* sp. n.: Japan (Kyushu, Ryukyus)

(1) *Cavillatrix calliphorina* Richter

(Figs. 4, 7, 10)

Cavillatrix calliphorina Richter, 1986, Trud. zool. Inst. SSSR, 146: 101.

Male. Head densely grayish white pollinose, gena and occiput grayish; antenna brown-black, base of 1st flagellomere reddish yellow; arista reddish brown; palpus reddish yellow. Frons at the narrowest point 0.04-0.05 of head width; frontal vitta very narrow and linear on posterior 2/5, strongly widened anteriorly, slightly wider than fronto-orbital plate at middle; parafacial nearly as wide as 1st flagellomere at middle height; gena 0.22 of eye height; face weakly concave, lower margin of face rather strongly produced forward, distance between base of vibrissa and apex of lower margin of face in profile about 4/5 as long as pedicel. Inner vertical seta fine hair-like, only slightly longer than upper postocular setae; ocellar seta fine, slightly shorter than inner vertical seta; 12-14 frontal setae, lowest seta nearly level with middle of pedicel; fronto-orbital plate with several fine hairs on inner portion; vibrissa inserted above level of lower margin of face by about 3/4 length of pedicel; gena with fine long black hairs; occiput with several rows of fine black hairs. Antenna falling short of lower margin of face by about 4/5 length of pedicel; pedicel with a long seta about 3 times as long as its own length; 1st flagellomere about 3.5 times as long as pedicel. Arista including plumosity about 2 times as wide as 1st flagellomere.

Palpus slender, only slightly bulged at apex, about as long as 1st flagellomere; prementum open dorsally, about 4/9 as long as eye height. Eye densely long-haired.

Thorax including scutellum black in ground color; dorsum rather thinly grayish, somewhat brownish, pollinose, with 2 rather narrow inner and 2 broad outer longitudinal vittae; pleura rather densely grayish white pollinose. 2+2 acr; 0+3 ia, 1st postsutural seta fine and long; distance between bases of subapical scutellar setae about 2 times that between basal and subapical setae of corresponding side.

Wing hyaline, only slightly tinged with pale brown; lower calypter pale yellowish brown. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 2:5.5:3; vein M from dm-cu crossvein to its bend about 1.7 times as long as distance between the bend and wing margin; last section of vein CuA₁ slightly more than 2/3 length of dm-cu crossvein.

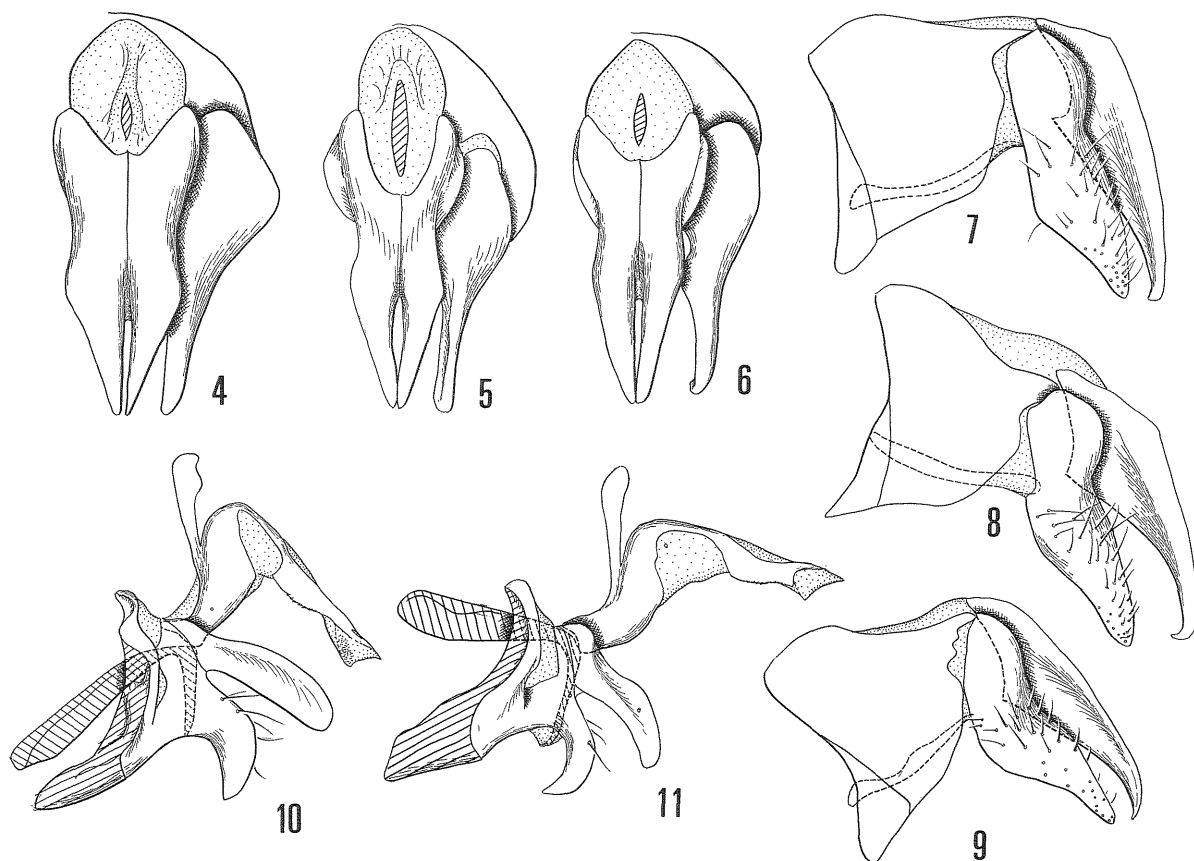
Legs black, tibiae yellowish brown. Mid tibia with 2 ad setae.

Abdomen black in ground color, thin and

evenly grayish, somewhat brownish, pollinose dorsally; the pollinosity denser on anterior portion of each tergum; venter rather densely grayish white pollinose. Hairs on dorsum fine dense and rather long; 3rd tergum with 4 rather fine and long median marginal setae.

Male genitalia: 6th tergum well sclerotized and rather long, with a row of setae; gonopod with several strong hairs; cerci in dorsal view narrowed at apical 2/5, narrowly separated from each other on apical 1/3; surstylus in lateral view narrowed at apical 1/4, with dense short hairs.

Female. Differing from male as follows: Vertex about 0.18 of head width; frontal vitta rather weakly widened anteriorly, slightly wider than fronto-orbital plate at middle; outer vertical seta slightly shorter than inner seta; ocellar seta fine and short, hair-like; 1 prevertical and 2 proclinate orbital setae; vibrissa inserted only slightly above level of lower margin of face; gena about 0.23 of eye height; legs yellowish except tarsi, femora slightly darkened on narrow apices; claws and pulvilli short; 3rd abdominal tergum without median marginal setae.



Figs. 4-11. Epandrium, cerci and surstylus in dorsal view (4-6) and in lateral view (7-9); hypandrium, gonopod, paramere and aedeagus in lateral view (10-11). 4, 7, 10. *Cavillatrix calliphorina* Richter; 5, 8. *C. luteipes* Shima et Chao (after Shima & Chao, 1992); 6, 9, 11. *C. bukidnon* sp. n.

Body length, 6.1-6.2 mm; wing length, 5.1-5.8 mm.

Distribution. Russian Far East (Primorye).

Specimens examined: RUSSIAN FAR EAST, Primorye: Paratype male of *C. calliphorina*, Kedrovaya Pady, Hasan. R.-N., 3.viii.1978, Kasparyan; paratype female of *C. calliphorina*, Gorno-Taeshin. ST., 20 km SW Ussuriska, 30.viii.1978, Kasparyan (all in IZAS).

Remarks. This species seems to be closely allied to two Oriental species, *C. luteipes* and *C. bukidnon*, but may be easily distinguished from them by the broadly pollinose abdomen and yellowish brown tibiae.

(2) *Cavillatrix luteipes* Shima et Chao

(Figs. 5, 8)

Cavillatrix luteipes Shima et Chao, 1992, Jpn. J. Ent., 60: 642.

This species very closely resembles *C. calliphorina* and *bukidnon*, but is distinguished from the former by narrowly pollinose abdominal dorsum and from the latter by entirely yellow legs. The male genitalia of these 3 species closely resemble each other and differ slightly in the shape of the cerci and surstylus. Detailed description was given by Shima & Chao (1992).

Distribution. China (Yunnan).

Type specimen examined: Holotype male of *C. luteipes*, CHINA, Yunnan, Xishuangbanna, Menghai, 1,200 m, 12.x.1989, H. Shima (KIZ).

(3) *Cavillatrix bukidnon* sp. nov.

(Figs. 6, 9, 11)

Male. Head grayish white pollinose, fronto-orbital plate, gena and occiput brownish; antenna brown-black, base of 1st flagellomere reddish brown; arista reddish brown; palpus reddish yellow. Frons at the narrowest point about 0.06 of head width; frontal vitta strongly widened anteriorly, subequal in width to fronto-orbital plate at middle; parafacial about 3/5 as wide as 1st flagellomere at middle height; gena 0.2-0.21 of eye height; lower margin of face rather strongly produced forward, distance between base of vibrissa and apex of lower margin of face in profile about 3/4 as long as pedicel. Inner vertical and ocellar setae indistinct; postocellar seta fine and long; 9-14 frontal setae, lowest seta nearly level with middle of pedicel; vibrissa inserted slightly above level of lower margin of face; occiput with many fine black hairs. Antenna falling short of lower margin of face by about length of pedicel; pedicel with a long seta more than 3 times as long as its own length; 1st flagellomere 3.8-4 times as long as pedicel. Arista including plumosity about 2 times as wide as 1st flagellomere. Palpus only slightly swollen at apex, about as long as 1st flagellomere;

prementum very short, about 1/3 as long as eye height. Eye densely long-haired.

Thorax rather thinly brownish gray pollinose on dorsum, grayish pollinose on pleura; 4 narrow longitudinal black vittae present on dorsum. 2+2 acr; 0+3 ia, 1st postsutural seta rather short; lateral scutellar seta absent; apical scutellar seta about 4/5 as long as subapical seta, and about 2 times as long as scutellum; distance between bases of subapical scutellar setae about 3 times that between basal and subapical setae of corresponding side.

Wing hyaline, slightly tinged with pale brown; calypter pale brown. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1:2.5:1.2; vein M from dm-cu crossvein to its bend about 1.5 times as long as distance between the bend and wing margin; last section of vein CuA₁ slightly less than 1/2 length of dm-cu crossvein.

Legs black; pulvilli pale yellowish. Fore tibia with 1 p seta; mid tibia with 1-2 ad, 1 pd and 1 v setae. Claws and pulvilli long.

Abdomen shining black in ground color, rather thinly grayish white pollinose on narrow anterodorsal portion of 3rd and 4th terga, the pollinosity expanding to anterolateral 1/2-2/3 of each 3rd and 4th terga, and grayish white pollinose on almost entire 5th tergum; dorsum of 3rd and 4th terga appearing brownish from certain angles. Hairs dense fine and erect; 3rd tergum with 2 fine median marginal setae.

Male genitalia: Cerci in dorsal view narrowly separated from each other on apical 1/3 and converging apically; surstylus in lateral view rather strongly narrowed beyond the middle, with rather strong and short hairs.

Female. Unknown.

Body length, 5.4-5.7 mm; wing length, 5.3-5.7 mm.

Distribution. Philippines (Mindanao).

Holotype male, PHILIPPINES, Mindanao, Bukidnon, 1,480 m, Mt. Katanglad, 27-31.x.1959, L. W. Quate (BISHOP).

Paratype: PHILIPPINES: 1 male, same data as holotype (BISHOP).

Remarks. This species closely resembles *C. calliphorina* from Russian Far East and *luteipes* from southwest China. Distinguishing characters are mentioned under these species. In the male genitalia this species is characterized by rather strongly narrowed surstylus beyond the middle.

(4) *Cavillatrix equatorialis* sp. nov.

Female. Head densely whitish pollinose, gena grayish; antenna with scape, pedicel and base of 1st flagellomere reddish brown; arista reddish yellow-brown; palpus reddish yellow. Vertex about 0.18 of head width; frontal vitta weakly widened anteriorly,

subequal in width to fronto-orbital plate; parafacial subequal in width to 1st flagellomere at middle height; gena about 0.2 of eye height; lower margin of face well produced forward, distance between base of vibrissa and apex of lower margin of face in profile about as long as pedicel. Inner vertical seta about $\frac{3}{8}$ length of eye height; outer vertical seta about $\frac{2}{3}$ as long as inner seta; ocellar seta absent; 1 prevertical and 2 proclinate orbital setae, the latter longer than inner vertical setae; 9-10 frontal setae, lowest seta nearly level with base of pedicel; fronto-orbital plate with a few fine short hairs; vibrissa inserted above level of lower margin of face by about $\frac{3}{5}$ length of pedicel; gena with rather sparse black hairs mixed with whitish ones on posterior portion; occiput with only a few black hairs near vertex. Antenna falling short of lower margin of face by about length of pedicel; pedicel with a long seta slightly less than 2 times its own length; 1st flagellomere about 3.2 times as long as pedicel. Arista including plumosity about 1.5 times as wide as 1st flagellomere. Palpus only slightly swollen at apex, subequal in length to 1st flagellomere; prementum slightly more than $\frac{3}{5}$ length of eye height. Eye bare.

Thorax densely grayish pollinose, postsutural scutum broadly black on anterior $\frac{2}{3}$ between rows of ia setae. 2+2 acr; 1+3 ia; lateral scutellar seta absent; apical scutellar seta about 2 times as long as scutellum, slightly shorter than subapical seta; distance between bases of subapical scutellar setae about 2.5 times that between basal and subapical setae of corresponding side.

Wing slightly tinged with pale brown; lower calypter pale brownish. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:4:2; vein M from dm-cu crossvein to its bend about 2 times distance between the bend and wing margin; last section of vein CuA_1 about 2.5 times as long as dm-cu crossvein.

Legs black; pulvilli pale brown. Fore tibia with 1 p seta; mid tibia with 1 ad seta. Claws and pulvilli short.

Abdomen reddish yellow, dark brown on mid-dorsal excavation of syntergum 1+2; each tergum thinly pale yellowish white pollinose on narrow anterior portion, the pollinose area expanding posteriorly on side of each tergum. Hairs on dorsum dense fine short and recumbent; 3rd tergum without median marginal seta.

Male. Unknown.

Body length, ca. 7.9 mm; wing length, ca. 7.3 mm.

Distribution. Singapore.

Holotype female, SINGAPORE, Chomgi Mangrove, 29.ix.1974, D. H. Murphy (BMNH).

Remarks. This species is characterized by reddish yellow abdomen and black legs. Male of this species is unknown, but this species is distinct from any other species treated in this paper by the combination of these characters.

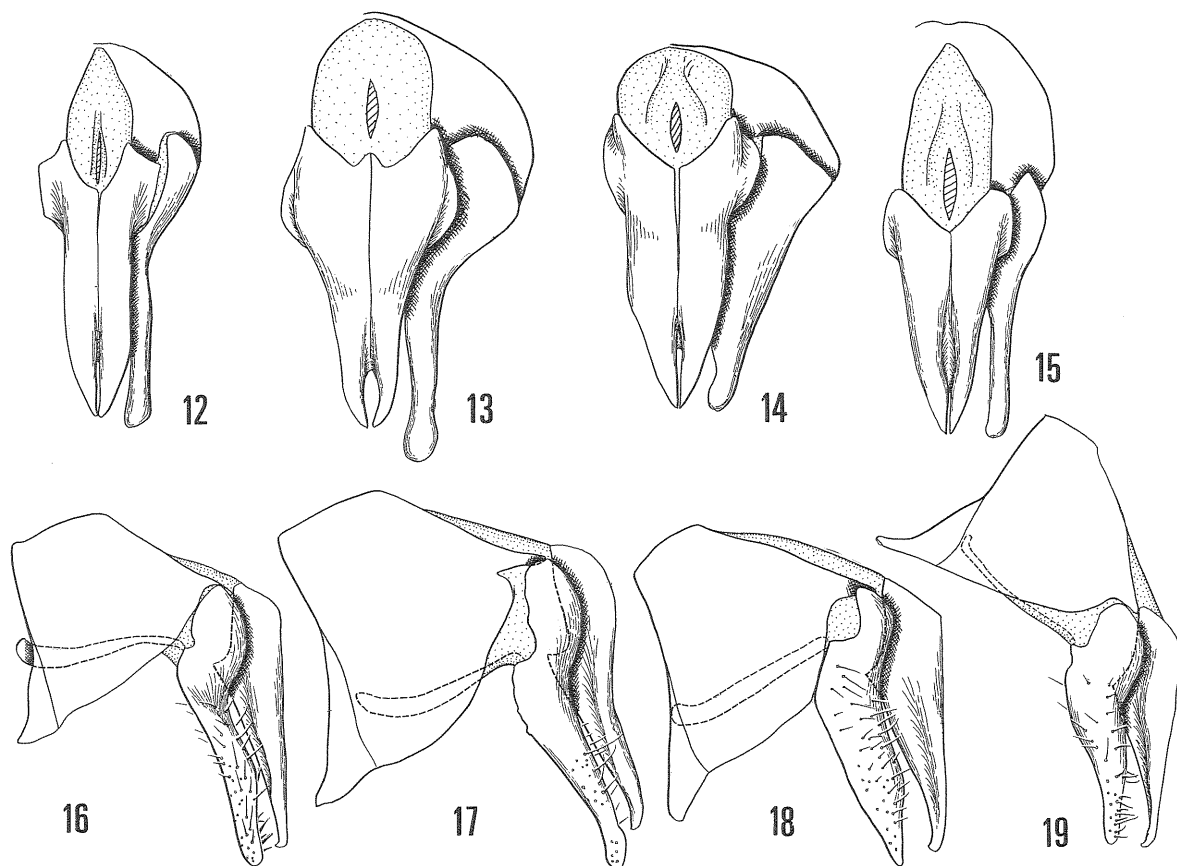
(5) *Cavillatrix gymnops* sp. nov.

(Figs. 12, 16, 20, 32)

Male. Head densely whitish pollinose, genal dilation and occiput grayish pollinose; antenna brown-black; arista brown; palpus yellowish. Vertex 0.12-0.13 of head width; frontal vitta widened anteriorly, about 2 times as wide as fronto-orbital plate at middle; parafacial narrowed below, slightly narrower than 1st flagellomere at middle height; face weakly concave, lower portion strongly projected forward, distance between vibrissal base and apex of lower margin of face in profile slightly less than $\frac{1}{2}$ length of 1st flagellomere; gena about 0.19 of eye height. Inner vertical seta fine hair-like, at most only slightly longer than hairs around vertex; ocellar seta fine hair-like, slightly shorter than postocellar seta; postocellar seta fine, as long as inner vertical seta; 14-16 rather fine frontal setae, lowest seta inserted slightly below level of middle of pedicel; fronto-orbital plate with rather sparse fine black hairs on inner portion; gena with rather short fine black hairs mixed with several whitish ones on lower and posterior portion; vibrissa inserted above level of lower margin of face by about $\frac{2}{5}$ length of pedicel; occiput with fine black hairs on upper portion. Antenna falling short of lower margin of face by about length of pedicel; pedicel with a long seta about 3 times as long as its own length; 1st flagellomere about 4.2 times as long as pedicel. Arista including plumosity about 2 times as wide as 1st flagellomere. Palpus slender, only slightly widened apically, slightly shorter than 1st flagellomere. Prementum slightly less than $\frac{1}{2}$ length of eye height. Eye almost bare.

Thorax densely pale yellowish gray pollinose; postsutural scutum squarely black on anterior $\frac{2}{3}$ between intra-alar areas; scutellum black on basal $\frac{1}{2}$. 2+1 acr; 0+2 ia; lateral scutellar seta fine hair-like, at most $\frac{3}{4}$ as long as scutellum; distance between bases of subapical scutellar setae slightly more than twice that between basal and subapical setae of corresponding side; apical scutellar seta slightly shorter than subapical seta, about 1.2 times as long as scutellum.

Wing hyaline, slightly tinged with pale brown especially on anterior portion; lower calypter pale yellowish brown. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:3.5:2; vein M from dm-cu crossvein to its bend about 3 times as long as distance between the bend and wing margin; last section of vein CuA_1 about $\frac{1}{2}$ as long as dm-cu



Figs. 12-19. Epandrium, cerci and surstylus in dorsal view (12-15) and in lateral view (16-19). 12, 16. *Cavillatrix gymnops* sp. n.; 13, 17. *C. similis* sp. n.; 14, 18. *C. antennalis* sp. n.; 15, 19. *C. curtichela* sp. n.

crossvein.

Legs black; pulvilli pale brownish. Fore tibia with 1-2 (usually 1) p setae; mid tibia with 1 ad seta. Claws and pulvilli long.

Abdomen shining yellow, reddish on posterior portion of 4th tergum and on 5th, shining dark brown on mid dorsal longitudinal portion of 3rd and 4th terga, posterior 1/3 of 4th tergum and posterior 1/2-1/3 of 5th, apex of 5th tergum more or less reddish; dorsum thinly yellowish pollinose on narrow anterior portion of 3rd to 5th terga, venter more broadly pollinose on 4th and 5th terga. Hairs fine short dense and recumbent, rather sparse on anterior portion of 5th tergum; 3rd tergum without median marginal seta.

Male genitalia: 6th tergum reddish yellow, without hair; synsternum 7+8 shining brown-black; cerci rather narrow in dorsal view, nearly parallel-sided from basal 1/3 to apical 1/3, then narrowed to apex; surstylus narrow, nearly parallel-sided from basal 1/3 to apex, with several short strong hairs dorsally and fine hairs ventrally.

Female. Differing from male as follows: Vertex 0.19-0.2 of head width; frontal vitta slightly narrower than fronto-orbital plate at middle; parafacial

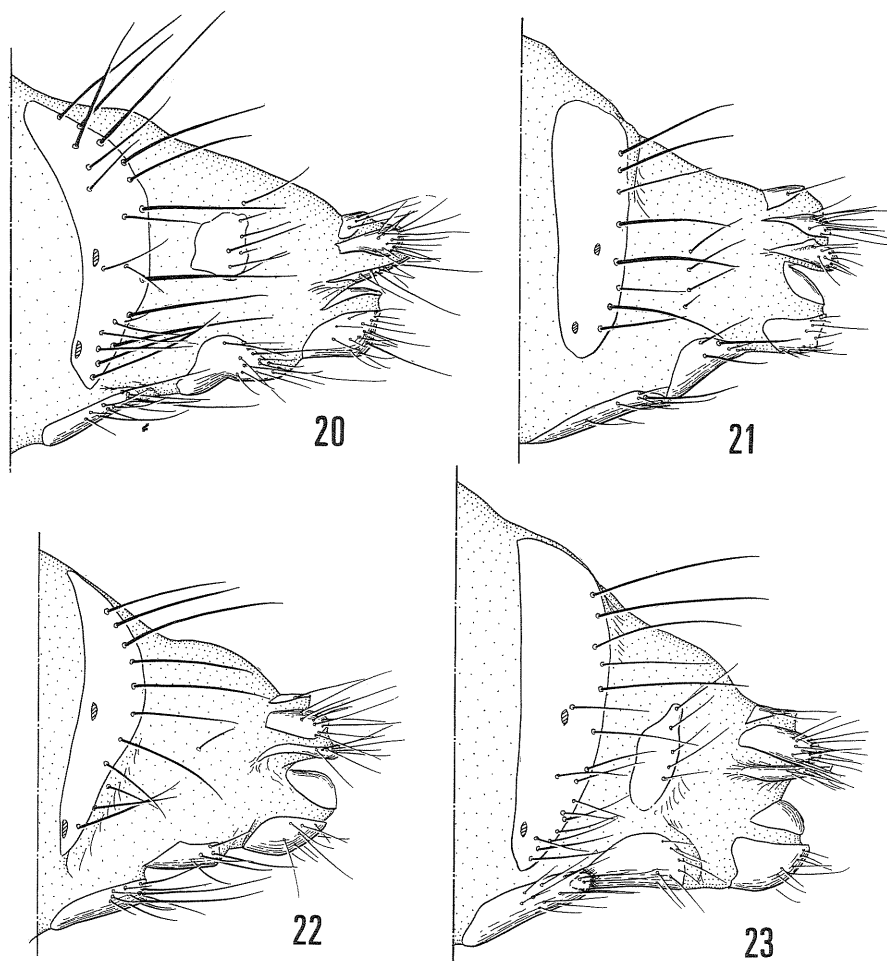
subequal in width to 1st flagellomere at middle height; gena about 0.2-0.23 of eye height; inner vertical seta about 2/5 length of eye height; outer vertical seta about 1/2 as long as inner seta; ocellar seta fine and short but distinct; 1 prevertical and 2 proclinate orbital setae; 9-10 frontal setae; lower portion of gena with whitish hairs; 1st flagellomere about 4 times as long as pedicel; 0+3 ia setae, 1st postsutural seta very fine; legs with femora reddish yellow on basal 1/2-2/3; claws and pulvilli short; abdominal dorsum rather thinly whitish or pale yellowish white pollinose on narrow anterior portion of 3rd tergum, anterior 1/4-1/5 of 4th and entire 5th; venter pollinose on anterior 1/2 of 3rd and 4th terga and entire 5th. Female genitalia: 6th hemitergite with rows of strong hairs; 7th hemitergite of small sclerite, with several short hairs on posterior 1/2; 7th sternum transversely constricted near middle; epiproct with several fine hairs.

Body length, 6.9-8.6 mm; wing length, 6.9-8 mm.

Distribution. Japan (Kyushu, Ryukyus).

Holotype male, JAPAN Kyushu, Fukuoka, Aburayama, 15.viii.1989, H. Shima (BLKU).

Paratypes: KYUSHU: 6 males, same locality



Figs. 20-23. Female genitalia in lateral view. 20. *Cavillatrix gymnops* sp. n.; 21. *C. similis* sp. n.; 22. *C. antennalis* sp. n.; 23. *C. fijiana* sp. n.

and collector as holotype, 5.viii.1989; 3 males, same as preceding, 11.viii.1989; 5 males, same data as holotype; 4 males, same locality and collector as holotype, 19.viii.1989; 1 female, Fukuoka, Mt. Inunaki, 29.viii.1969, M. Honda; RYUKYUS: 1 female, Okinawa, Yona, 19.x.1973, R. Kano (all in BLKU).

Remarks. This species resembles *C. equatorialis* in general appearance, but differs from it in having longer 1st flagellomere and broadly reddish femora in female.

(6) *Cavillatrix similis* sp. nov.

(Figs. 13, 17, 21, 33)

Closely resembling *C. gymnops*, but differing as follows:

Male. Vertex narrower, 0.1-0.11 of head width; parafacial subequal in width to 1st flagellomere at middle height; distance between vibrissal base and apex of lower margin of face in profile about as long as pedicel; antenna falling short of lower margin of face by about length of pedicel; 1st flagellomere about 3.5 times as long as pedicel; palpus weakly darkened at base; 0+3 ia setae; later-

al scutellar seta absent; distance between bases of subapical scutellar setae about 2.5 times that between basal and subapical setae of corresponding side; relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:4:2; coxae reddish brown, trochanters reddish yellow. Male genitalia: Cerci in dorsal view rather strongly narrowed to apex, rather well separated from each other on apical 1/5; surstylus in lateral view weakly narrowed to apex, apical portion slightly swollen, with fine hairs.

Female. Differing from male as follows: Vertex 0.19-0.2 of head width; frontal vitta slightly narrower than fronto-orbital plate at middle; parafacial subequal in width to 1st flagellomere at middle height; gena about 0.2-0.23 of eye height; inner vertical seta about 2/5 length of eye height; outer vertical seta about 1/2 as long as inner seta; ocellar seta absent; 1 prevertical and 2 proclinate orbital setae; 9-10 frontal setae; lower portion of gena with whitish hairs; femora reddish yellow on basal 2/3; claws and pulvilli short; abdominal dorsum thinly whitish or pale yellowish white pollinose on narrow anterior portion of 3rd and 4th terga and anterior 1/2-1/3 of 5th. Female genitalia: 7th hemitergite with

a row of marginal hairs; 7th tergum absent, represented by a row of hairs; epiproct with a pair of fine hairs.

Body length, 6.2-6.7 mm; wing length, 6.4-6.7 mm.

Distribution. Indonesia (Irian Jaya), Papua New Guinea (New Guinea).

Holotype male, INDONESIA, New Guinea, Neth. Hollandia Area, W. Sentani, Cyclops Mts., 150-250 m, 18.vi.1959, T. C. Maa (BISHOP).

Paratypes: PAPUA NEW GUINEA: 1 male 1 female, New Guinea NE, Morobe Distr., Arabuka, 1,500-2,000 m, 7.i.1968, J. & M. Sedlacek; 1 female, SE New Guinea, Kokoda, 400 m, 20.xi.1965, Malaise trap, J. Sedlacek (all in BISHOP).

Remarks. This species resembles the Japanese species *C. gymnops*, but may be distinguished from it by smaller and more slender body and shorter antenna.

(7) *Cavillatrix antennalis* sp. nov.

(Figs. 14, 18, 22, 34)

Male. Head densely whitish pollinose; antenna brown-black, scape, pedicel and base of 1st flagellomere paler. Vertex about 0.17 of head width; frontal vitta weakly widened anteriorly, subequal in width to fronto-orbital plate at middle; parafacial narrowed below, slightly more than 1/2 width of 1st flagellomere at middle height; face well concave, lower portion strongly projected forward, distance between vibrissal base and apex of lower margin of face in profile slightly longer than pedicel; gena about 0.22 of eye height. Inner vertical seta rather strong, slightly less than 1/2 length of eye height; outer vertical seta developed, about 1/2 as long as inner seta; ocellar seta absent; postocellar seta fine and short; 1 rather fine proclinate orbital seta present; 10-11 rather fine frontal setae, lowest seta nearly level with base of 1st flagellomere; fronto-orbital plate with sparse minute black hairs on inner portion; gena with fine pale yellowish hairs mixed with several black ones on upper and anterior portion; vibrissa nearly level with lower margin of face; occiput with several fine black hairs on upper portion. Antenna falling short of lower margin of face by about length of pedicel; pedicel with a long seta about 1.5 times as long as its own length; 1st flagellomere about 5.3 times as long as pedicel. Arista including plumosity about as wide as 1st flagellomere. Palpus slender, only slightly widened apically, slightly more than 2/3 length of 1st flagellomere. Prementum about 1/2 length of eye height. Eye bare.

Thorax densely grayish pollinose; presutural area of scutum with 2 broad outer and 2 narrow inner longitudinal black vittae, outer vitta about as wide

as pollinose portion between inner and outer vittae, postsutural scutum squarely black on anterior 3/5 between rows of ia setae; scutellum black on basal 1/2. 2+1 acr; 0+3 ia; lateral scutellar seta absent; distance between bases of subapical scutellar setae about 2 times that between basal and subapical setae of corresponding side; apical scutellar seta slightly shorter than subapical seta, about 1.5 times as long as scutellum.

Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:4.5:2; vein M from dm-cu crossvein to its bend about 2 times as long as distance between the bend and wing margin.

Legs with coxae, trochanters and femora reddish yellow, apical 1/4 of femora darkened; tibiae and tarsi black; pulvilli pale brownish. Fore tibia with 1 p seta; mid tibia with 1 ad seta.

Abdomen broadly black, reddish yellow on anterolateral portion of 3rd tergum, venter of syntergum 1+2 and 3rd tergum and narrow apex of 5th; dorsum thinly pale yellowish white pollinose on narrow anterior portion of 3rd and 4th terga and entire 5th, venter evenly whitish pollinose. Hairs fine short dense recumbent and black on dorsum, sparse on 5th tergum and almost bare on its anterior 1/2; 1st sternum and mid ventral portion of syntergum 1+2 with pale yellowish hairs; 3rd tergum without median marginal seta.

Male genitalia: 6th tergum reddish yellow, rather weakly sclerotized, with a row of several hairs; systernum 7+8 shining brown-black; cerci rather broad in dorsal view, well narrowed from apical 1/3 to apex, surstylus rather broad in lateral view, evenly narrowed to apex, with dense fine hairs; epiphallus strongly inclined posteriorly.

Female. Differing from male as follows: Parafacial subequal in width to 1st flagellomere at middle height; head setae more strongly developed; inner vertical seta about 1/2 as long as eye height; outer vertical seta about 2/3 as long as inner seta; 1 prevertical and 2 proclinate orbital setae; ocellar seta fine and short but distinct; antenna falling short of lower margin of face by about 1.5 times length of pedicel; 1st flagellomere about 4 times as long as pedicel; claws and pulvilli short; abdominal dorsum broadly velvety black, very narrowly dull yellowish pollinose on side of 3rd and 4th terga and densely grayish white pollinose on entire 5th, venter reddish brown on syntergum 1+2 and anterior portion of 3rd, rather thinly whitish pollinose on anterior 1/2 of 3rd and 4th terga and entire 5th. Female genitalia: 6th hemitergite with a row of strong hairs on posterior portion; 7th tergum absent, represented by a few hairs; epiproct with a pair of rather long hairs.

Body length, 6.5-6.8 mm; wing length, 6.4-7.1 mm.

Distribution. Fiji (Viti Levu).

Holotype male, FIJI, Viti Levu, Mt. Victoria, 1,000 m, 4-6.iii.1978, H. Shima (BISHOP).

Paratypes: FIJI: 2 females, same data as holotype except collector, H. Kurahashi & H. Shima (BLKU).

Remarks. This species resembles the Japanese species *C. gymnops*, but is different in having proclinate orbital seta in male, broadly black abdomen and long antenna. The male genitalia of this species are different from those of *gymnops* in the shape of the cerci and surstylus. The female 7th abdominal tergum is absent in this species, but 7th hemitergites are well sclerotized in *gymnops*.

(8) *Cavillatrix curtichela* sp. nov.

(Figs. 1, 15, 19, 35)

Closely resembling *C. antennalis*, but differing as follows:

Male. Vertex 0.15-0.16 of head width; frontal vitta weakly widened anteriorly, about 3/4 as wide as fronto-orbital plate at middle; face rather well concave, lower portion strongly projected forward, distance between vibrissal base and apex of lower margin of face in profile about 1.5 times as long as pedicel; gena 0.22-0.23 of eye height. Outer vertical seta about 3/4 as long as inner seta; ocellar seta fine and short but distinct; postocellar seta subequal in length to ocellar seta; 1 fine prevertical and 2 proclinate orbital setae present, anterior proclinate seta strong; 6-9 rather fine frontal setae, lowest seta nearly level with base of 1st flagellomere; occiput with several rows of fine black hairs on upper 1/3. Antenna with 1st flagellomere about 4.5 times as long as pedicel. Arista including plumosity slightly wider than 1st flagellomere. Palpus about 3/4 as long as 1st flagellomere. Prementum about 5/8 as long as eye height.

Thorax densely pale yellowish gray pollinose; presutural area of scutum with 2 broad outer and 2 narrow inner longitudinal black vittae, outer vitta about 2/3 as wide as pollinose portion between inner and outer vittae. Lower portion of katepisternum with pale yellowish white hairs mixed with black ones; 0+2-3 ia, if 3 postsutural setae present, then 1st postsutural seta very fine; distance between bases of subapical scutellar setae slightly less than 3 times that between basal and subapical setae of corresponding side.

Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1:2.5:1; vein M from dm-cu crossvein to its bend about 2.5 times distance between the bend and wing margin.

Legs with coxae, trochanters and femora pale reddish yellow, apices of femora narrowly darkened. Claws and pulvilli shorter than 5th tarsomeres.

Abdomen broadly reddish yellow, darkened on mid dorsal longitudinal portion of syntergum 1+2 to 4th tergum and lateral portion of 5th; dorsum rather thinly pale yellowish white pollinose on narrow anterior portion of 3rd and 4th terga and almost entire 5th. Hairs rather fine short dense and recumbent on dorsum, sparse and erect on 5th tergum.

Male genitalia: Cerci in dorsal view evenly narrowed to apex; surstylus in lateral view weakly curved near middle, rather slender on apical 1/3.

Female. Differing from male as follows: Vertex about 0.22 of head width; frontal vitta subequal in width to fronto-orbital plate at middle; parafacial slightly narrower than 1st flagellomere at middle height; head setae more strongly developed; inner vertical setae nearly parallel to each other, about 1/2 length of eye height; antenna with 1st flagellomere about 3.5 times as long as pedicel; abdominal dorsum dark brown on mid dorsal longitudinal portion of syntergum 1+2 to 5th tergum and posterior 1/2 of 3rd and 4th terga; 5th abdominal tergum rather densely pale yellowish white pollinose.

Body length, 4.9-5.1 mm; wing length, 4.6-5 mm.

Distribution. Fiji (Viti Levu).

Holotype male, FIJI, Viti Levu, Nausori Highlands, 500 m, 7-8.iii.1978, H. Shima (BISHOP).

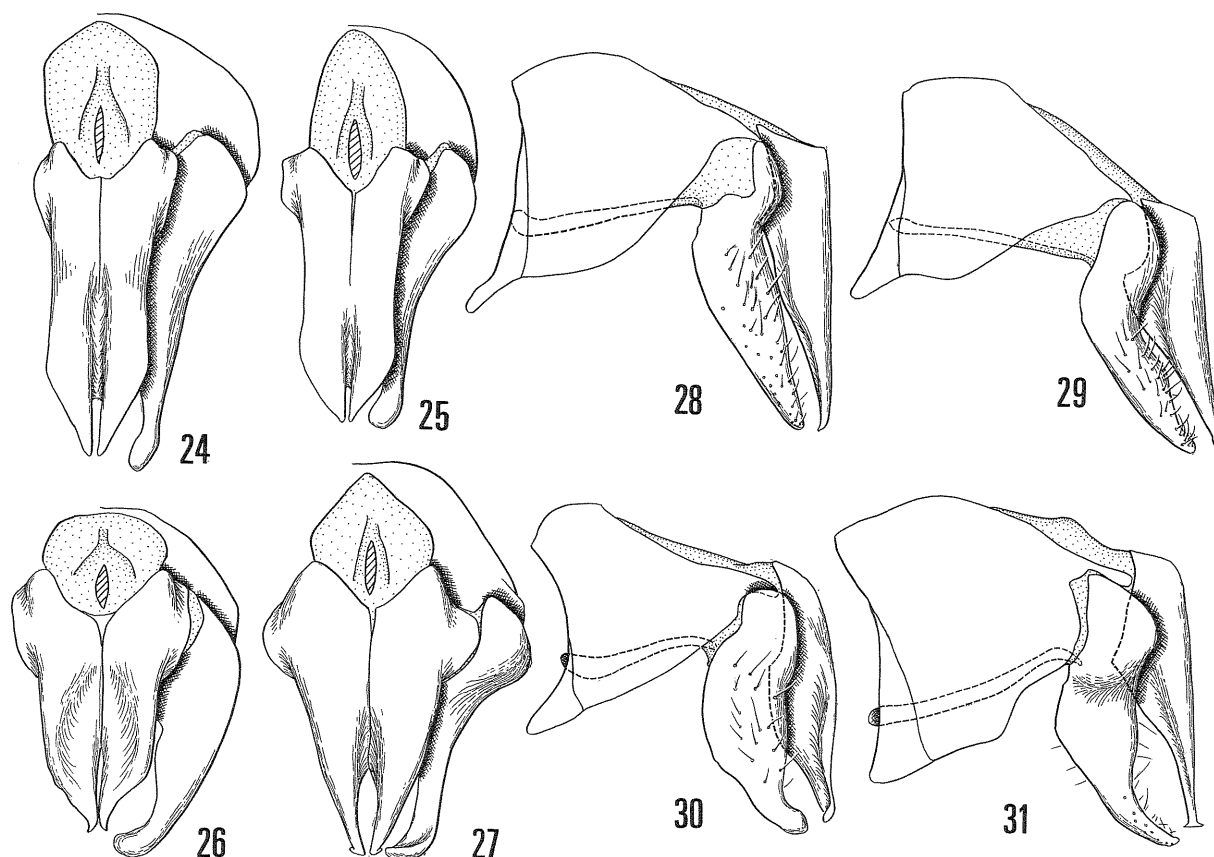
Paratypes: FIJI: 1 male 4 females, same data as holotype except collector, H. Shima & H. Kurahashi (BLKU).

Remarks. The male of this species is characterized by short claws and pulvilli. In other respects this species closely resembles *C. antennalis*, but may be easily distinguished from it by smaller size, shorter antenna and broadly reddish abdomen.

(9) *Cavillatrix fijiana* sp. nov.

(Figs. 2, 23, 25, 29, 36)

Male. Head densely whitish pollinose, gena and occiput grayish; antenna brown-black; arista brown; palpus yellowish, broadly and weakly darkened at base. Vertex about 0.12 of head width; frontal vitta about 2 times as wide as fronto-orbital plate at middle; parafacial weakly narrowed below, subequal in width to 1st flagellomere at middle height; lower portion of face strongly projected forward, distance between vibrissal base and apex of lower margin of face in profile about 1.5 times as long as pedicel; gena about 0.25 of eye height. Inner vertical seta fine; ocellar seta fine hair-like, slightly longer than postocellar seta; 14-16 frontal setae, lowest seta inserted slightly below level of middle of pedicel; vibrissa inserted above level of lower margin of face by about 2/5 length of pedicel. Antenna falling short of lower margin of face by about length of pedicel; pedicel with a long seta about 2 times as long as its



Figs. 24-31. Epandrium, cerci and surstylus in dorsal view (24-27) and in lateral view (28-31). 24, 28. *Cavillatrix intermedia* sp. n.; 25, 29. *C. fijiana* sp. n.; 26, 30. *C. palpis* sp. n.; 27, 31. *C. papuana* sp. n.

own length; 1st flagellomere slightly less than 4 times length of pedicel. Arista including plumosity about twice as wide as 1st flagellomere. Palpus slightly longer than 1st flagellomere. Prementum about $\frac{2}{3}$ as long as eye height. Eye bare.

Thorax densely pale yellowish gray pollinose; presutural area of scutum with 2 broad outer and 2 narrow inner longitudinal black vittae, outer vitta about $\frac{2}{3}$ as wide as pollinose portion between inner and outer vittae; postsutural scutum squarely black on anterior $\frac{3}{5}$ between rows of dc setae and longitudinally black between rows of dc and ia setae of each side; 0+3 ia, 1st postsutural seta very fine; lateral scutellar seta absent; distance between bases of subapical scutellar setae about 2 times that between basal and subapical setae of corresponding side.

Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:4:2; vein M from dm-cu crossvein to its bend slightly more than 2 times as long as distance between the bend and wing margin.

Legs black, trochanters reddish brown; pulvilli pale brownish. Fore tibia with 1 p seta.

Abdomen reddish yellow, black on syntergum 1+2, mid dorsal longitudinal area of 3rd and 4th terga, posterior $\frac{1}{3}$ of 4th tergum and entire 5th except narrow apex; entire dorsum of 3rd and 4th

terga thinly pale yellowish white pollinose, the pollinosity denser on anterior portion of each tergum, 5th tergum rather densely pale yellowish white pollinose on whole dorsum; venter whitish pollinose on anterior $\frac{1}{2}$ of 3rd and 4th terga. Hairs on dorsum rather fine dense and long; 3rd tergum with 2 rather fine median marginal setae.

Male genitalia: 6th tergum dark brown, weakly sclerotized, without hair; synsternum 7+8 shining brown-black; cerci in dorsal view broad, narrowed to apex on apical $\frac{1}{5}$; surstylus curved dorsally near middle; epiphallus rather strongly inclined posteriorly.

Female. Differing from male as follows: Vertex about 0.19 of head width; frontal vitta slightly narrower than fronto-orbital plate at middle; gena about 0.22-0.23 of eye height; inner vertical setae developed, crossing each other apically, slightly less than $\frac{2}{5}$ length of eye height; outer vertical seta about $\frac{2}{3}$ as long as inner seta; 1 prevertical and 2 proclinate orbital setae present; ocellar seta fine and short but distinct; 8-9 frontal setae; lower portion of gena with whitish hairs; 1st flagellomere about 3.3 times as long as pedicel; legs with coxae, trochanters and femora reddish yellow, femora darkened on distal $\frac{1}{3}$ - $\frac{1}{4}$; claws and pulvilli short; ab-

dominal dorsum broadly black, reddish on anterolateral portion of 3rd and 4th terga, rather densely dull yellowish pollinose on anterior 1/3-1/4 of 3rd and 4th terga and entire 5th, venter evenly and thinly grayish white pollinose. Female genitalia: 6th hemitergite with rows of strong hairs; 7th hemitergite small and weakly sclerotized, with a row of hairs on posterior portion; epiproct with a few hairs.

Body length, 5.5-6.3 mm; wing length, 5.7-6.4 mm.

Distribution. Fiji (Viti Levu).

Holotype male, FIJI, Viti Levu, 25 km N Vatukarasa, 700 m, 9.iii.1978, H. Shima (BISHOP).

Paratypes: FIJI: 1 female, Viti Levu, Mt. Victoria, 1,000 m, 4-6.iii.1978, H. Kurahashi; 1 female, Viti Levu, Nausori Highlands, 500 m, 7-8.iii.1978, H. Kurahashi (all in BLKU).

Remarks. This species resembles *C. gymnops* and *similis*, but may be easily distinguished from them by the wider gena and entirely pollinose 5th abdominal tergum. Additionally, females of this species may be distinguished from those of other species by broadly black abdomen.

(10) *Cavillatrix intermedia* sp. nov.

(Figs. 24, 28, 37)

Closely resembling *C. fijiana*, but differing as follows:

Male. Vertex about 0.13 of head width; gena about 0.22 of eye height; ocellar seta fine and rather long, slightly shorter than postocellar seta; 1st flagellomere about 3.5 times as long as pedicel. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:3.5:2; vein M from dm-cu crossvein to its bend about 2.5 times as long as distance between the bend and wing margin. Legs black, coxae, trochanters and basal 2/5 of mid and hind femora reddish yellow. Abdominal dorsum with dense fine short recumbent hairs on 3rd and 4th terga, finer and erect hairs on 5th; 3rd tergum without median marginal setae.

Male genitalia: 6th tergum dark brown; synsternum 7+8 shining brown-black; surstylus in lateral view rather broad, nearly straight; epiphallus slender and long.

Female. Unknown.

Body length, ca. 6.7 mm; wing length, ca. 6.7 mm.

Distribution. Vanuatu.

Holotype male, NEW HEBRIDES [= VANUATU], Erromango, 8 km W of Ipotia, 100-200 m, iii.1970, N. L. H. Krauss (BISHOP).

Remarks. This species is very similar in general appearance to *C. fijiana*, but differs mainly in the color of legs and relative length of gena. The male

genitalia of this species also closely resemble those of *fijiana*, but the surstylus is broader and nearly straight.

(11) *Cavillatrix plumifera* (Bezzi) comb. nov.

Rhinomyiobia plumifera Bezzi, 1928, Diptera Fiji: 194.

Female. Head densely whitish pollinose; scape, pedicel and base of 1st flagellomere reddish brown; palpus yellowish. Vertex narrow, 0.19 of head width; frontal vitta slightly narrower than fronto-orbital plate; parafacial subequal in width to 1st flagellomere at middle height; face weakly concave, lower portion strongly produced forward, distance between base of vibrissa and apex of lower margin of face in profile about as long as pedicel; gena about 0.25 of eye height. Inner vertical seta about 1/4 as long as eye height; outer vertical seta 3/4 as long as inner seta; ocellar seta fine; 1 prevertical and 2 proclinate orbital setae; 9 frontal setae, lowest seta inserted slightly above level of apex of pedicel; fronto-orbital plate very sparsely short-haired; occiput with 3-4 black hairs on upper portion. Antenna falling short of vibrissal level by about length of pedicel; 1st flagellomere about 3.5 times as long as pedicel. Arista including plumosity wider than 1st flagellomere. Palpus subequal in length to 1st flagellomere. Eye bare.

Thorax including scutellum black in ground color, densely grayish white pollinose; presutural area of scutum with 4 longitudinal vittae, inner vitta very narrow and outer ones broad; postsutural scutum with broad quadrate black portion on anterior 2/3, which is interrupted longitudinally by 2 narrow pollinose areas; 2+1 acr; 0+3 ia, 1st postsutural seta very fine.

Wing weakly and evenly tinged with brown; lower calypter pale brownish. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 2:6:3.5; vein M from dm-cu crossvein to its bend about 2 times as long as distance between the bend and wing margin.

Legs with femora reddish yellow, apices narrowly darkened; tibiae and tarsi brown-black; pulvilli pale brown. Claws and pulvilli shorter than 5th tarsomeres.

Abdomen broadly reddish yellow; mid-dorsal portion of posterior 1/2-1/3 of each tergum black, the black area of 3rd and 4th terga triangularly expanding to posterior portion; venter broadly reddish yellow; 3rd tergum thinly whitish pollinose on anterior 1/3-1/4, 4th rather thinly whitish pollinose on anterior 1/2-1/3, and 5th evenly and rather densely whitish pollinose; venter very thinly and evenly whitish pollinose.

Body length, ca. 6.3 mm; wing length, ca. 5.8 mm.

Distribution. Fiji (Viti Levu).

Type specimen examined: FIJI: 1 cotype female of *R. plumifera*, Cuve, 19.viii.1919, R. Veitch (BMNH).

Other specimen examined: FIJI: 1 female, Viti Levu, Nausori Highlands, 500 m, 7-8.iii.1978, H. Shima (BLKU).

Remarks. This species was originally described by Bezzi (1928) as a new species of *Rhinomyiobia*, but Cantrell & Crosskey (1989) treated it as an unplaced Leskiini. This species can be readily assigned to *Cavillatrix*. This species closely resembles *C. fijiana*, but is different from it in slender body and more broadly reddish abdomen.

(12) *Cavillatrix palpis* sp. nov.

(Figs. 26, 30, 39)

Male. Head densely whitish pollinose, genal dilation and upper occiput darkened; antenna brown-black, apical portion of pedicel and base of 1st flagellomere reddish yellow; arista brown; palpus yellowish. Vertex about 0.06 of head width; frontal vitta very narrow on upper 1/2, widened anteriorly, about 1/2-2/3 as wide as fronto-orbital plate at middle; parafacial slightly narrowed below, nearly as wide as 1st flagellomere at middle height; face weakly concave, lower portion strongly projected forward, distance between vibrissal base and apex of lower margin of face in profile nearly as long as 1st flagellomere; gena about 0.2 of eye height. Inner vertical seta fine hair-like; ocellar seta fine hair-like, slightly longer than postocellar seta; postocellar seta fine, as long as inner vertical seta; 14-16 rather fine frontal setae, lowest seta inserted slightly below level of middle of pedicel; fronto-orbital plate with sparse fine black hairs on inner portion; gena with fine rather long black hairs mixed with several whitish ones on lower and posterior portion; vibrissa inserted above level of lower margin of face by about 2/5 length of pedicel; occiput with 1-2 rows of fine black hairs on upper portion. Antenna falling short of lower margin of face by about length of pedicel; pedicel with a long seta about 2 times as long as its own length; 1st flagellomere about 3.5 times as long as pedicel. Arista including plumosity about 2 times as wide as 1st flagellomere. Palpus short and slender, about 1/2 as long as 1st flagellomere, with a long hair on ventro-subapical area. Prementum about 4/9 of eye height. Eye densely long-haired.

Thorax including scutellum black in ground color, densely pale yellowish gray pollinose; postsutural scutum squarely black on anterior 3/5 between rows of ia setae and brownish pollinose between rows of ia and supra-alar setae of each side; anterior 3/5 of postsutural scutum appearing transversely black between bases of wings when seen from above;

scutellum black on basal 1/2. 2+1 acr; 0+3 ia; lateral scutellar seta absent; distance between bases of subapical scutellar setae slightly more than twice that between basal and subapical setae of corresponding side.

Wing hyaline, slightly tinged with pale brown on anterior portion; calypter pale yellowish brown. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:4:2; vein M from dm-cu crossvein to its bend about 2.5 times as long as distance between the bend and wing margin; last section of vein CuA₁ about 1/2 as long as dm-cu crossvein.

Legs black, trochanters and narrow bases of femora reddish yellow; pulvilli pale brownish. Fore tibia with 1 p seta; mid tibia with 1-2 ad setae. Claws and pulvilli long.

Abdomen yellowish, brown-black on mid dorsal excavation of syntergum 1+2, narrow mid dorsal longitudinal portion of 3rd tergum, posterior triangular portion of 4th tergum and almost entire 5th; dorsum rather densely pale yellowish pollinose on narrow anterior portion of 4th and anterior 1/2 of 5th, venter thinly whitish pollinose on narrow anterior portions of 3rd and 4th terga and anterior 1/2 of 5th. Hairs dense fine short and suberect on 3rd and 4th terga, rather sparse long still finer and erect on 5th; 3rd tergum without median marginal seta.

Male genitalia: 6th tergum with a row of hairs; cerci in dorsal view very broad, apical 1/6 portion narrowed, apices directed outward; surstylus broad in lateral view, apical portion narrowed and curved dorsally; epiphallus strongly curved posteriorly on apical 1/2.

Female. Unknown.

Body length, 6.3-7.1 mm; wing length, 7-7.3 mm.

Distribution. Papua New Guinea (New Guinea).

Holotype male, PAPUA NEW GUINEA, New Guinea, Wau, 1,200 m, 22.x.1965, J. & M. Sedlacek, Malaise trap (BISHOP).

Paratypes: PAPUA NEW GUINEA, New Guinea: 1 male, same locality and collectors, 11.x.1965; 1 male, Wau, Morobe Distr., 1,200 m, 15-16.i.1963, J. Sedlacek, Malaise trap; 1 male, Morobe Distr., 1,100 m, 11.x.1965, J. & M. Sedlacek, Malaise trap (all in BISHOP).

Remarks. This species is very distinct in its short palpus and densely hairy eyes. In other respects this species resembles the Japanese species *C. gymnops*. The male genitalia of this species are much more different from those of other *Cavillatrix* species. In the structure of the male genitalia this species seems to be closely related to *C. papuana*.

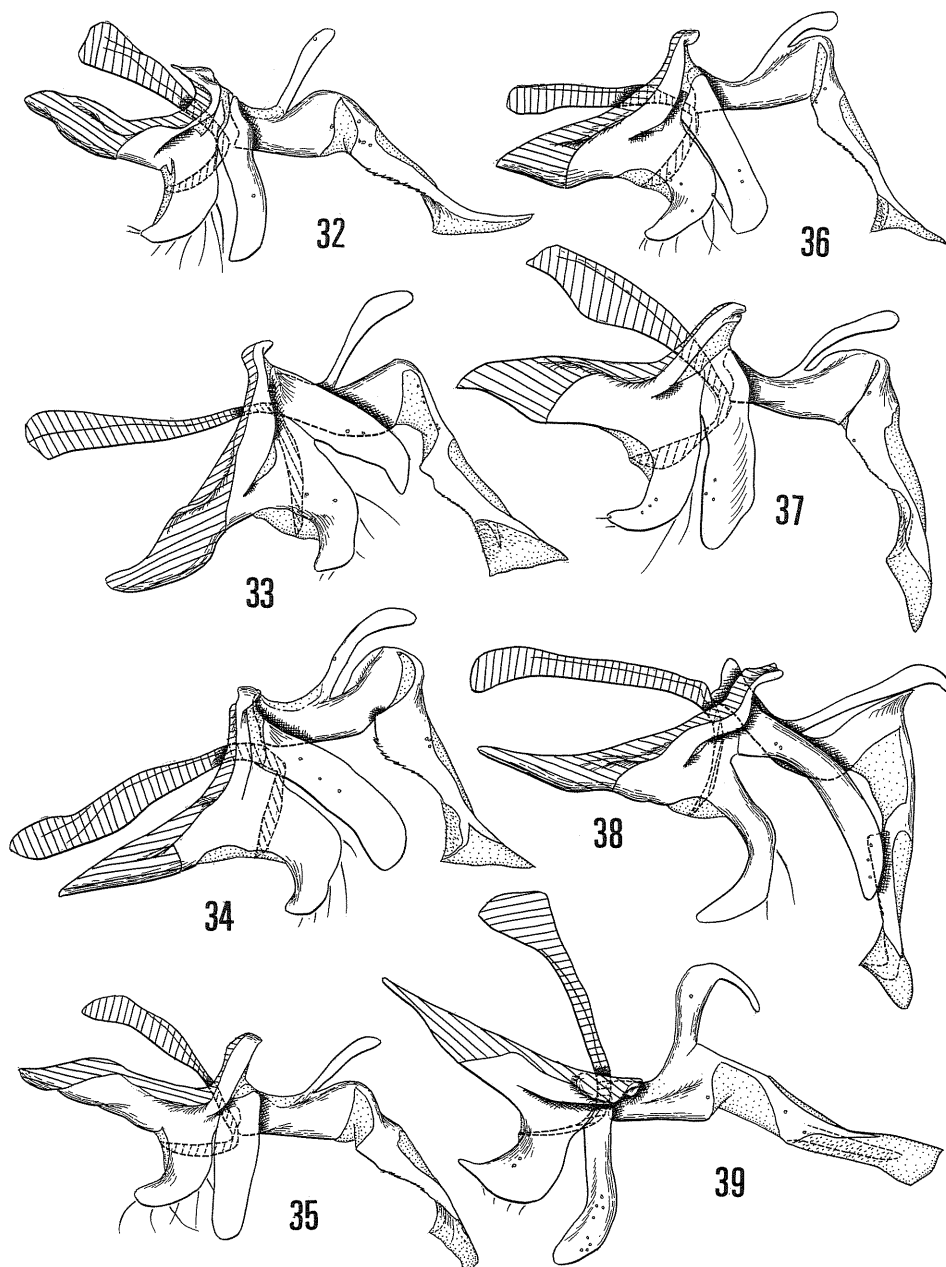
(13) *Cavillatrix papuana* sp. nov.

(Figs. 27, 31, 38)

Closely resembling *C. palpis*, but differing as follows:

Male. Head densely whitish gray pollinose, lower occiput white. Vertex about 0.08 of head width; frontal vitta wider, about 1.5 times as wide as fronto-orbital plate at middle; parafacial about 5/8 as wide as 1st flagellomere at middle height; face rather strongly concave; gena about 0.26 of eye height; ocellar seta very fine, shorter than postocellar seta; 12-14 rather fine frontal setae, lowest seta nearly level with base of 1st flagellomere;

antenna falling short of lower margin of face by about 1/2 length of pedicel; pedicel with a long seta about 1.5 times as long as its own length; 1st flagellomere about 4.2 times as long as pedicel; arista including plumosity about as wide as 1st flagellomere; palpus slender, slightly widened apically, without distinct long hair on ventro-subapical area, slightly shorter than 1st flagellomere; prementum slender, closed dorsally, about 2/3 length of eye height. Thoracic dorsum densely brownish gray pollinose, the pollinosity denser on postpronotal lobe, anterior portion of presutural area of scutum and notopleural area; pleura grayish



Figs. 32-39. Hypandrium, gonopod, paramere and aedeagus in lateral view. 32. *Cavillatrix gymnops* sp. n.; 33. *C. similis* sp. n.; 34. *C. antennalis* sp. n.; 35. *C. curtichela* sp. n.; 36. *C. fijiana* sp. n.; 37. *C. intermedia* sp. n.; 38. *C. papuana* sp. n.; 39. *C. palpis* sp. n.

white pollinose; 0+2 ia; distance between bases of subapical scutellar setae slightly less than twice that between basal and subapical setae of corresponding side. Wing hyaline, slightly and evenly tinged with pale brown; relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:3.5:2; vein M from dm-cu crossvein to its bend about 2 times as long as distance between the bend and wing margin; last section of vein CuA₁ about 2/5 as long as dm-cu crossvein. Legs black, bases of femora narrowly and weakly reddish brown; pulvilli pale brownish. Abdomen brown-black, broadly reddish on side and venter of syntergum 1+2 and 3rd tergum and anterolateral and ventral portion of 4th; dorsum rather densely pale yellowish white pollinose on narrow anterior portion of 3rd and 4th terga and anterior 1/3 of 5th, mid dorsal portion of 3rd tergum thinly brownish pollinose; hairs rather dense fine short and suberect on 3rd and 4th terga, sparse still finer longer and erect on 5th; 3rd tergum with 2 fine and long median marginal setae. Male genitalia: 6th tergum rather long, with a row of hairs; cerci in dorsal view broad and narrowed apically, separated from each other on apical 1/4; surstylus curved dorsally and inwardly at apex, with rather fine hairs on inside; gonopod narrow and long, curved ventrally at middle, with 2 hairs on posterior margin; paramere very long; basiphallus long and curved dorsally; epiphallus inclined posteriorly and close to basiphallus.

Female. Unknown.

Body length, ca. 5.4 mm; wing length, ca. 5.4 mm.

Distribution. Papua New Guinea (New Guinea).

Holotype male, PAPUA NEW GUINEA, New Guinea, Mt. Kaindi, 2,350 m, 30.iv.1966, J. L. Gressitt, Malaise trap (BISHOP).

Remarks. This species is characterized by long palpus and slender proboscis in which the labium is closed dorsally over the labrum. The male genitalia of this species are peculiar and very characteristic in possessing slender and long gonopod, very long paramere, and elongate basiphallus and epiphallus.

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