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BIBIONIDAE (Diptera) OF NEW GUINEA^{1, 2}

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Previous to this study 14 species of Bibionidae have been recorded from New Guinea: 10 *Plecia*, 2 *Bibio* and 2 *Dilophus*. The collections at hand contain 49 species: 35 *Plecia*, 24 being described as new; 8 *Bibio*, 2 being described as new; 5 *Dilophus*, 3 are n. sp.; also 1 species of *Enicoscolus* is recorded.

Over 3000 specimens have been examined from approximately 100 localities over the entire island of New Guinea. These are from the following collections: B. P. Bishop Museum; American Museum of Natural History; Zoologisches Museum der Humboldt Universität, Berlin; Zoological Museum, Bogor, Java; and Rijksmuseum v. Natuurlijke Historie, Leiden.

I greatly appreciate the privilege of studying these valuable collections. This now gives us a much more complete understanding of this interesting fauna. Much of the preliminary sorting of species, and preparation of male genitalia for study was done by Dr Mercedes Delfinado and the drawings were made by Miss Geraldine Oda. I am very grateful for this assistance.

Genus *Bibio* Geoffroy

Only 2 species, *obediens* Osten-Sacken and *plecioides* Osten-Sacken have previously been recorded from New Guinea. The present collection contains 8 species. One, *flavissimus* Brunetti? is apparently the same as that which has been recorded as this species from the Philippines, 2 new species are being described, *anposis* and *xuthopteron*, and 3 are left undescribed until further material can be obtained.

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 2. Part of the specimens examined are results of fieldwork supported by grants to Bishop Museum from the National Institutes of Health (AI 01723) and the National Science Foundation (G-4774, 10734; GB-518, 3245); and a grant to J. L. Gressitt from the J. S. Guggenheim Foundation (1955-56).

This genus needs to be reviewed completely for the South West Pacific and South East Asian regions. Most of the species are not well known. The associations of the sexes are not always definite and the ranges of variations have not been studied. I see no characteristics of the ♂ genitalia which appear to be of any significance for members of this genus in the Pacific.

KEY TO BIBIO KNOWN FOR NEW GUINEA

1. Females 2
Males.....6
2. Thorax predominantly or entirely rufous 3
Thorax black..... 5
3. Coxae, trochanters and femora entirely rufous..... 4
Legs predominantly or entirely black..... **plecioides** Osten-Sacken
4. Anterior margin of wing, costal, subcostal and R₁ cells intense yellow. Posterior veins yellow. Inner spur of front tibia less than .50 as long as outer (fig. 2); Assam, India, Philippines and New Guinea **flavissimus** Brunetti?
Anterior portion of wing dark brown, posterior veins brown. Inner spur over .50 as long as outer (fig. 3b); New Guinea, New Hebrides, Indonesia?..... **obediens** Osten-Sacken
5. Inner spur subequal to outer (fig. 6). Abdomen rufous, smaller sp., body 6.3-7.0 mm n. sp.? ♀ rel. to **depressus** de Meijere
Inner spur not over .60 the length of outer; outer spur broad (fig. 1a). All black, large species, body and wings, 10.5-11.0 mm **anposis** n. sp.
6. Spurs of front tibia sharp pointed (fig. 2, 5a) 7
Outer spur of front tibia rounded, blunt at apex (best seen from lateral view). Large all black species (♂♂ will probably run here) **anposis** n. sp.
7. Legs entirely black or only slightly tinged with rufous in ground color of the femora ... 8
Femora predominantly or entirely rufous. Wings uniformly brown colored. Hind basitarsus long and slender (fig. 5b) **xuthopteron** n. sp.
8. Pile of thorax and abdomen dark brown to black 10
Thorax and abdomen densely yellow pilose or abdomen yellow pilose and thorax predominantly so 9
9. Wings subhyaline, to faintly yellow fumose, yellowish in cells along anterior margin. Posterior veins pale yellow. Inner spur of front tibia less than .50 as long as outer; Assam, India, Philippines, New Guinea..... **flavissimus** Brunetti?
Wings brown in cells on anterior margin, posterior veins brown. Inner spur over .50 as long as outer (fig. 4) **plecioides** Osten-Sacken
10. Wings dark brown along anterior margin, posterior veins brown. Hind basitarsus straight sided, about 4× longer than wide (fig. 3c). Inner spur of front tibia over .50 as long as outer (fig. 3a) **obediens** Osten-Sacken
Wings evenly tinged brownish yellow, with basitarsus of hind legs slender, 6× or more longer than wide and densely long haired; or wings faintly yellow-brown, darker anteriorly with hind basitarsus narrowed at base, thickened apically n. sp.?

Bibio anposis Hardy, new species Fig. 1a-c.

A very large, shiny black species presently known only from the ♀ but obviously fitting near *tenebrosus* Coquillett from Japan (for a discussion of this species refer to Hardy & Takahashi, 1960: 440, fig. 31a-e; and for a discussion of the species complex refer to

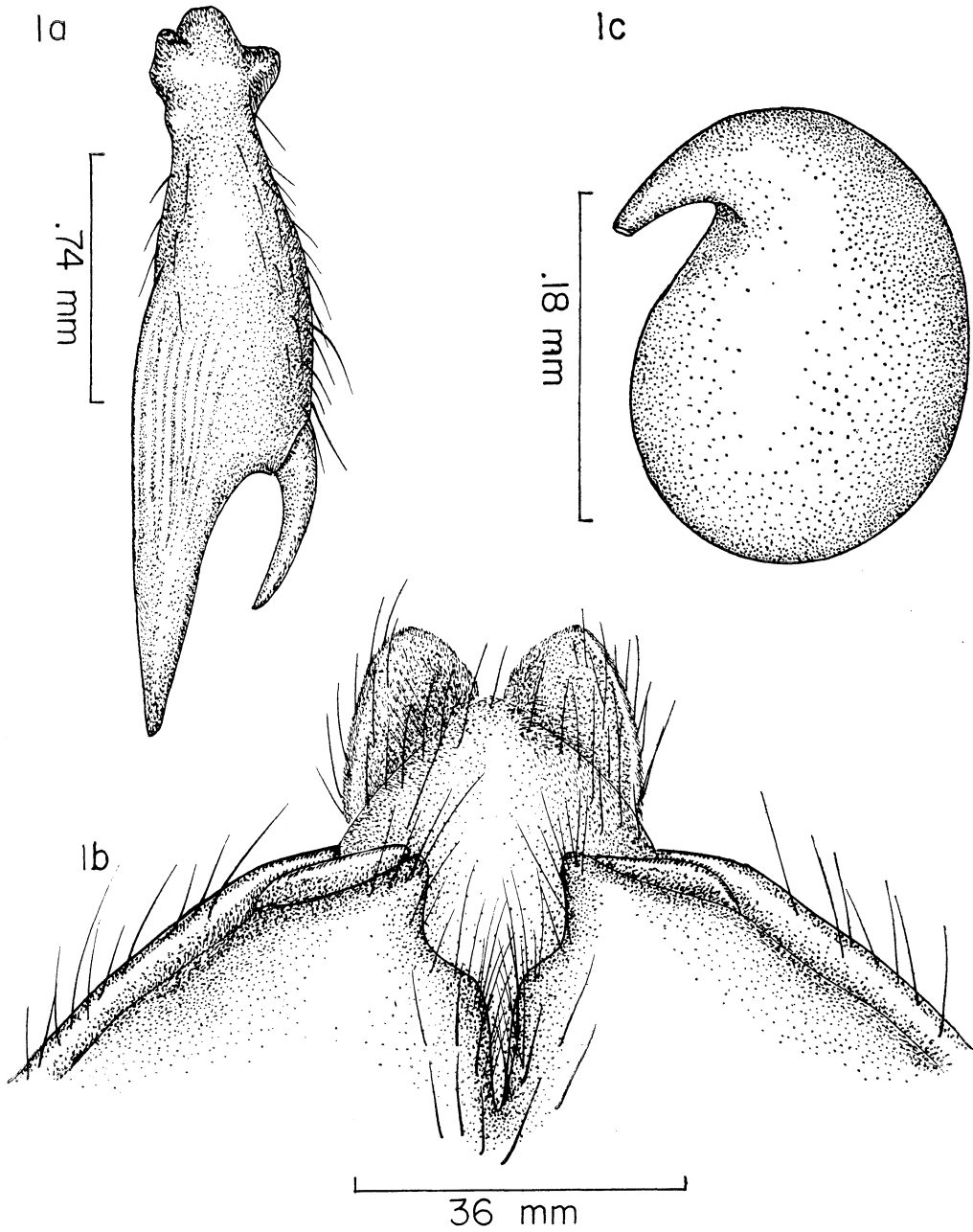


Fig. 1. *Bibio anposis* n. sp.: a, front tibia; b, egg guide of ♀; c, spermatheca.

Hardy, 1965 : 14). This species is readily differentiated from any of the known members of the *tenebrosus* complex by having the mesonotum and front of head polished black, smooth,

not subopaque, dull, densely covered with microscopic tubercles. Also the front is not carinate below, and the inner spur of the front tibia is much stronger than in any of the other species of this complex, extending approximately .60 the length of the outer spur (fig. 1a). Also the posterior veins of the wing of *anopsis* are black, these veins are dark gray in the other species.

♀. *Head*: Entirely metallic black except for eyes, integument smooth. Front completely flat, not carinate in median portion, rather thickly covered with short, erect, black setae. Eye oblong, slightly narrower posteriorly and about .33 longer than high. Portion of head behind compound eye about equal in length to eye. Sclerotized portion of head in front of eye very slightly produced, scarcely beyond basis of antennae. Antennae entirely black, with 9 flagellomeres, the last 2 very closely joined. Last segment of palpus about $2.5\times$ longer than wide. *Thorax*: Polished black except for a tinge of rufous on humeri and tinges of yellow to rufous at margins of some sclerites of pleura. Mesonotum thickly covered with short black setae. Integument of mesonotum smooth, not at all wrinkled or tuberculate. Knobs of halteres dark brown to black, stems brownish yellow. *Legs*: Entirely black except for tips of spurs which are rufous. Outer spur of tibia broad, subacute at apex. Inner spur extending about .60 as long as outer (fig. 1a). *Wings*: Costal, radial and upper portion of cell M_1 dark brown, also with brown coloring through basal cells. Stigma just slightly darker than membrane; posterior portion of the wing faintly brown colored. Posterior veins dark brown to black, much darker than wing membrane. Vein M_2 extends to or very near margin in the type. This is apparently variable, and in some specimens M_2 evanesces distinctly before the margin; vein M_{3+4} evanesces before reaching margin. The r-m crossvein about .75 as long as basal portion of Rs. *Abdomen*: Opaque dark brown to black on dorsum covered with gray-brown pollen and black pilose. Venter subshiny black. Each spermatheca has a short hook-shaped stem (fig. 1c). Egg guides as in fig. 1b.

Length: Body and wings, 10.5-11.0 mm.

♂. Unknown. It is probable that the ♂ will be differentiated from other *Bibio* known from New Guinea by having the outer spur of the front tibia rounded, blunt at apex, especially as seen in lateral view.

Holotype ♀ (BISHOP 7746), NE New Guinea: Wau, 1750 m, 26.I.1966, malaise trap, J. and M. Sedlacek. 36♀ paratypes, from the following localities. NE New Guinea: same locality as type, 1250-1700 m, VI.1962-VIII.1965, J. & M. Sedlacek; Mt Missim, 1600-2000 m, 21-24.IX.1964, M. Sedlacek; Wau, Edie Creek, 2100-2300 m, 3.X.1964, J. Sedlacek. NW New Guinea: Wisselmeren, Enarotali, 1850-2050 m, 5-6.VIII.1962 and VIII.1955, J. Sedlacek & J. L. Gressitt; Wisselmeren, Kamo-Debei Div., 1700 m, 13.VIII.1955, Gressitt; Wisselmeren, 1500 m, Itouda, Kamo Val., 13.VIII.1955, Gressitt; and Wisselmeren, Paniai, 1750 m, IX-XI.1939, H. Boschma. Type and most of the paratypes returned to the B. P. Bishop Museum. Other paratypes returned to the Zoological Museum, Leiden, and others in the University of Hawaii collection.

***Bibio flavissimus* Brunetti** Fig. 2.

Bibio flavissimus Brunetti, 1925, Rec. Ind. Mus. 27: 448.—Edwards, 1929, Notul. Ent. 9: 78.

Four specimens are on hand, 1♂ and 3♀♀, that fit specimens which are considered to be *flavissimus* from the Philippines. As discussed by Hardy & Delfinado (in press) it is doubtful that *flavissimus* actually occurs in the Pacific area but until further collecting is done in northeastern India (type locality, Assam) and in the Philippines and until a

good series of both sexes from both areas are carefully compared, it is not possible to separate these. The species was first recorded from the Philippines by Brunetti. This species is very close to *obediens* Osten-Sacken and the 2 may be synonymous. It appears that *flavissimus* is differentiated by having the anterior margin of the wing, the costal, subcostal and R_1 cells intensely yellow, rather than this portion of the wing dark brown; also by having the posterior veins of the wing yellow, rather than brown; and the inner spur of the front tibia less than .50 as long as the outer (fig. 2), rather than distinctly over .50 as long as the outer (fig. 3b).

The ♂ is shiny black except for the yellow humeral ridges and rufous tibial spurs; also the halteres are yellow, tinged faintly with yellow on the knobs. The abdomen, pleura, sides and hind portion of mesonotum are yellow pilose. The dorsal surface of the mesonotum has intermixed yellow and brown pile. The hind femur and tibia are moderately swollen, both about equal in diameter. The tarsi are straight-sided, not swollen, the basitarsus is about 4× longer than wide and almost 2× longer than the 2nd tarsomere. The wings are subhyaline, faintly tinged with yellow. The cells along the anterior margin are distinctly yellow. The stigma is brownish yellow. The posterior veins are pale yellow, just darker than the membrane.

Length of specimens on hand: ♂, body, 5.5 mm; wings, 5.0 mm; ♀, body, 6.0-7.5 mm; wings, 6.5-8.5 mm.

Type locality Cherrapunji, Assam (♀). Type in the Zoological survey of India collection.

SPECIMENS EXAMINED: NE NEW GUINEA: Wau, 1200 m, 9.XI.1965-8.I.1966, malaise trap, P. Shanahan, J. & M. Sedlacek; Wau, McAdam Park, 1400 m, 28.XII.1964, J. L. Gressitt. NW NEW GUINEA: 1♀, Vogelkop, Kebar Val., W of Manokwari, 550 m, 4-31.I.1962, L. W. Quate.

***Bibio obediens* Osten-Sacken** Fig. 3a-c.

Bibio obediens Osten-Sacken, 1881, Ann. Mus. Civ. Genova 16: 395.

This species fits very closely to *flavissimus* Brunetti, from Assam, India and the Philippines?, because of the all-rufous thorax, coxae and trochanters of the ♀. The only difference I see in *flavissimus* is that the wings are intensely yellow, especially along the anterior margin while in *obediens* they are darker colored, typically brown along the anterior margin; also the inner spurs of the front tibia are distinctly over .50 as long as the outer in *obediens* and are small, scarcely over .25 the outer in *flavissimus*. The head and the abdomen of the ♀ are usually entirely rufous, this may be somewhat variable, however; 1 specimen has the abdomen brown except for the terminalia, others have tinges of brown on the head. The inner spur of the front tibia is rather elongate, about .66 the length of the outer in most specimens (fig. 3b). This apparently does vary somewhat,

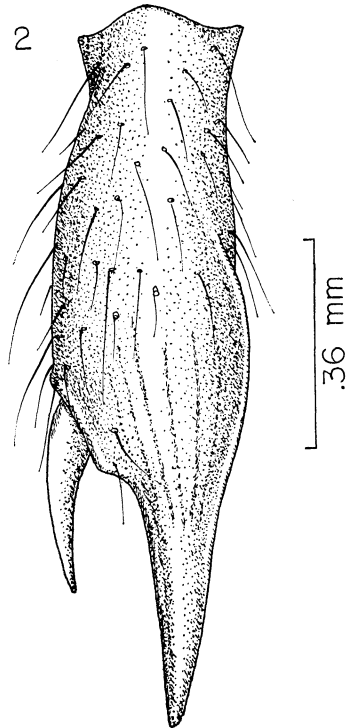


Fig. 2. *Bibio flavissimus* Brunetti, front tibia.

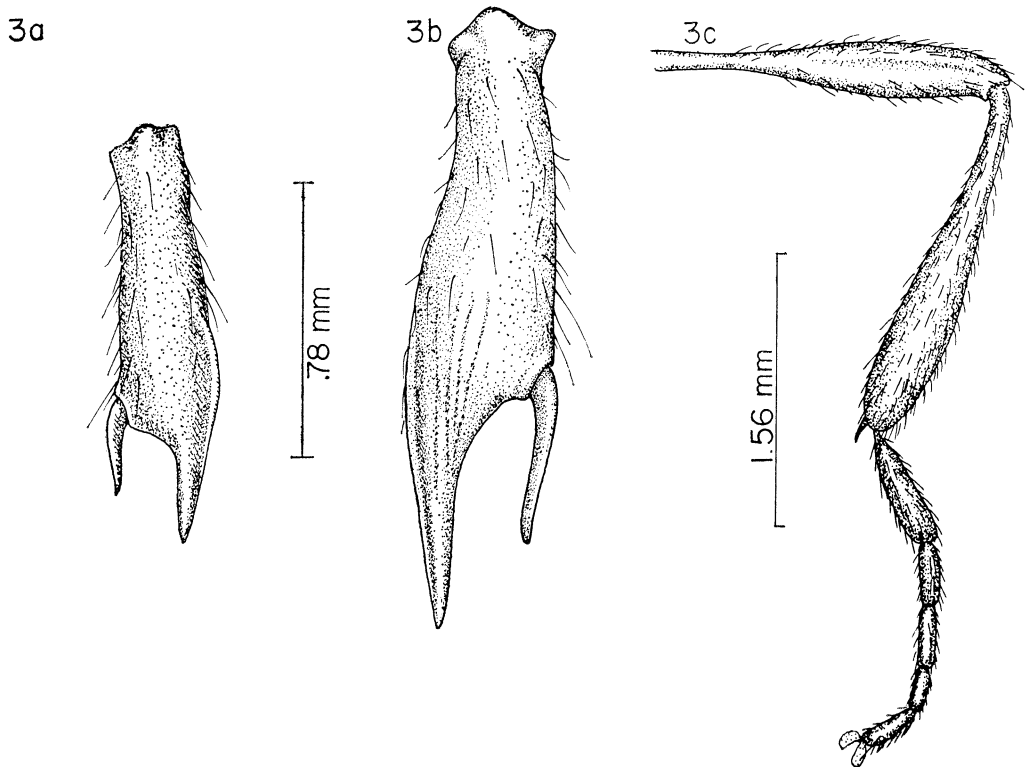


Fig. 3. *Bibio obediens* Osten-Sacken: a, front tibia of ♂; b, front tibia of ♀; c, hind leg of ♂.

and in 2 specimens the inner spur is just slightly over .50 as long as the outer. There is a possibility that these represent 2 species since the specimens with the shorter inner spurs consistently have the wings tinged more yellow with the anterior portion intensely yellow as in typical *flavissimus*. Also, note in the *flavissimus*-like specimens the posterior veins are yellow, just slightly darker than the membrane.

The ♂ specimens (which apparently belong here) characterized by having body and legs entirely black, covered with black pile and wings dark brown along anterior margin with posterior portion of wing pale fumose with veins light brown, distinctly darker than membrane. Front tibia similar to that of ♀ and as in fig. 3a. Hind tibia moderately swollen, slightly thicker than femur. Hind tarsus not at all swollen, tarsomeres straight sided as in fig. 3c.

Length of the specimens at hand: ♂. Body, 6.25 mm; wings, 6.0 mm. ♀. Body, 7.7-8.2 mm; wings, 8.5-9.25 mm.

Type locality Hatam (NW New Guinea). Type in the Museo Civico di Storia Naturale di Genova.

SPECIMENS EXAMINED: 7♀♀ and 4♂♂. NW NEW GUINEA: Sigi Camp, 1500 m, 22.II.1939, L. J. Toxopeus; Mist Camp, 1800 m, 31.I.1939, Toxopeus; Wisselmeren, Enarotali, 1800 m, 6.VIII.1955, J. L. Gressitt. NE NEW GUINEA: Torricelli Mts, Sugoitei Vill., 1900 m, 24.I.-5.II.1959, W. W. Brandt; Mt Missim, 1600-2000 m, 21-24.IX.1964, M. Sedlacek; Wau, 1750 m, 23.VIII.1965, malaise trap, J. & M. Sedlacek.

I have seen specimens from Santo, New Hebrides, which apparently belong to *obediens*, and Edwards (1926: 136) has recorded this from Buru, Indonesia. It should be noted that Edward's ♂♂ were obviously a different species than that discussed here. He stated that the wings of the ♂ are "whitish, stigma scarcely darkened."

Bibio plecioides Osten-Sacken Fig. 4.

Bibio plecioides Osten-Sacken, 1881, Ann. Mus. Civ. Genova 16: 396.

This species is obviously very close to and may possibly be synonymous with *bicolor* Walker (refer to Hardy, 1956: 89). The only character which I find for separating these is that in *bicolor* ♀♀ all coxae are red. In *plecioides* they are predominantly or entirely black. This alone would not be a reliable character; I see considerable variation in just the few specimens on hand. The ♂ of *bicolor* is not known and as with many other species from the Southwest Pacific and Southeast Asia much more field work is needed before the concepts of these species can be clearly understood. *B. plecioides* is also very similar to *imitator* Walker from Australia, but *imitator* differs by having the inner spur of the front tibia consistently smaller (scarcely over .25 as long as outer) than in *plecioides* and by having the coxae and abdomen of the ♀ entirely rufous.

This species has previously been known only from the ♀. Two ♂ specimens on hand apparently belong here.

♀. Characterized by having thorax entirely rufous and legs and abdomen entirely black. One specimen on hand with front coxa red, tinged faintly with brown, other coxae brown to blackish, tinged with red. This seems to be atypical; other specimens with coxae entirely black. I find some variation in the length of the inner spur of the front tibia. In one specimen this is slightly less than .50 the length of the outer, in another it is .66-.75 as long as the outer; the average seems to be just slightly over .50 the length of the outer (fig. 4). Wings rather intensely tinged with brown, dark brown along anterior margin. Posterior veins brown, distinctly darker than membrane. Veins M_2 and M_{3+4} evanesce before reaching wing margin. The r-m crossvein is about .66 as long as basal portion of Rs.

♂. Specimens which apparently belong here are entirely black except for the yellow humeral ridges and the rufous tibial spurs; 1 specimen with front coxa tinged with rufous. Thorax and abdomen densely yellow pilose. Anterior margin of wing brown, posterior portion subhyaline, very faintly tinged with brown. Posterior veins just slightly darker than membrane, tinged faintly with brown. I see no characteristics in the ♂ genitalia which appear to be of any significance.

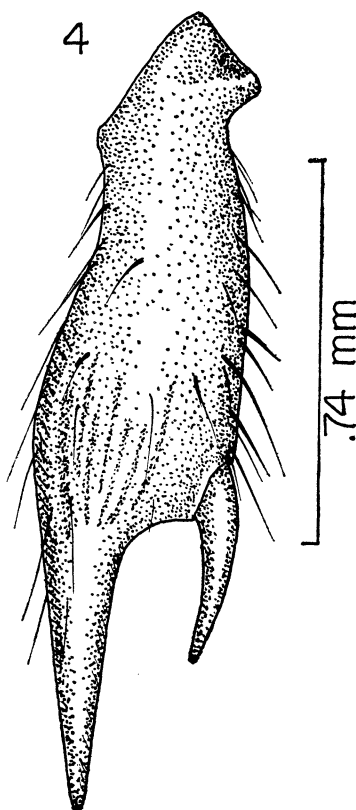


Fig. 4. *Bibio plecioides* Osten-Sacken: front tibia of ♀.

Length of the specimens on hand: ♂. Body and wings, 5.0-5.5 mm; ♀. Body, 6.0-7.0 mm; wings, 7.0-9.0 mm.

Type locality Hatam (NW New Guinea). Type in the Museo Civico di Storia Naturale di Genova.

SPECIMENS EXAMINED: 4♀♀ and 6♂♂. NW NEW GUINEA: Hollandia area, W Sentani, Cyclops Mts, 150-200 m, 18.VI.1959, J. L. Gressitt; Star Mts, Sibil Val., 1245 m, 18.X.-8.IX.1961, L. W. Quate; Wisselmeren, Obano, 1770 m, 9.VIII.1956, Gressitt; Wisselmeren, Paniai, 1750 m, IX-XI.1939, H. Boschma; and Central Mts, Mulik R., 10 km E of Archbold Lake, 1050 m, 25.XI-5.XII.1961, S. & L. Quate. SE NEW GUINEA: Owen Stanley Range, Goilala, Loloipa, 1-15.II.1958, W. W. Brandt. NE NEW GUINEA: Daulo Pass, 2500 m, 2.V.1959, C. D. Michener; Torricelli Mts, Sugoitei Vil., 500 m, 6-9.II.1959, Brandt.

Bibio xuthopteron Hardy, new species Fig. 5a-b.

This species is readily differentiated from other known *Bibio* from the Pacific by having the femora red, the wings uniformly brown and the hind basitarsus long and slender (fig. 5b). It superficially resembles a new species on hand from the New Hebrides, but the development of the hind tarsus is very different in the 2 and also the species from the New Hebrides is entirely black pilose.

♂. *Head:* Antennae and palpi entirely black, 8 flagellomeres present. Last segment of palpus almost 2× longer than wide and with prominent black setae on dorsal and apical portions. Lower divisions of compound eye rather short, about .50 of head length. Pile of underpart of head yellow-brown. *Thorax:* Entirely shiny black except for yellow humeral ridges; densely yellow pilose. Halteres yellow, tinged with brown especially on knobs. *Legs:* Coxae yellow pilose, front pair predominantly rufous, tinged with brown, middle and hind pair reddish brown to black. Front and middle femora entirely rufous, hind femur predominantly rufous, tinged with brown on attenuated portions. Tibiae black except for rufous spurs. Tarsi entirely black. Inner spur of front tibia extending about .66 length of outer (fig. 5a). Basal .50 of hind femur attenuated, apical portion swollen. Hind tibia evenly tapered to apex, about equal in width to femur. Tarsomeres long and slender, basitarsus straight-sided, over 6× longer than wide, 2× longer than 2nd tarsomere and approximately .40 as long as hind tibia (fig. 5b). *Wings:* Evenly brown, slightly darker along anterior margin, stigma concolorous with surrounding membrane. Crossvein r-m about .60 as long as basal portion of Rs. Posterior veins dark brown, darker than wing membrane. Veins M₂ and M₃₊₄ evanesce before reaching wing margin. *Abdomen:* Opaque black, rather densely yellow pilose, especially on sides. The genitalia have not been dissected; these are rarely of value in differentiating *Bibio*.

Length: Body and wings, 6.8-7.0 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7747), NW New Guinea: Wisselmeren, Tage L., 1760 m, 4.VIII.1955, J. L. Gressitt. Type in the B. P. Bishop Museum.

Bibio new species? ♀ related ***depressus*** de Meijere Fig. 6.

A series of ♀ specimens on hand would appear to fit near *Bibio depressus* de Meijere from Sumatra, but that species is known only from the ♂ and at this time it is not possible to be certain of its correct status. The specimens from New Guinea probably represent a distinct species and would appear to differ from de Meijere's description of the

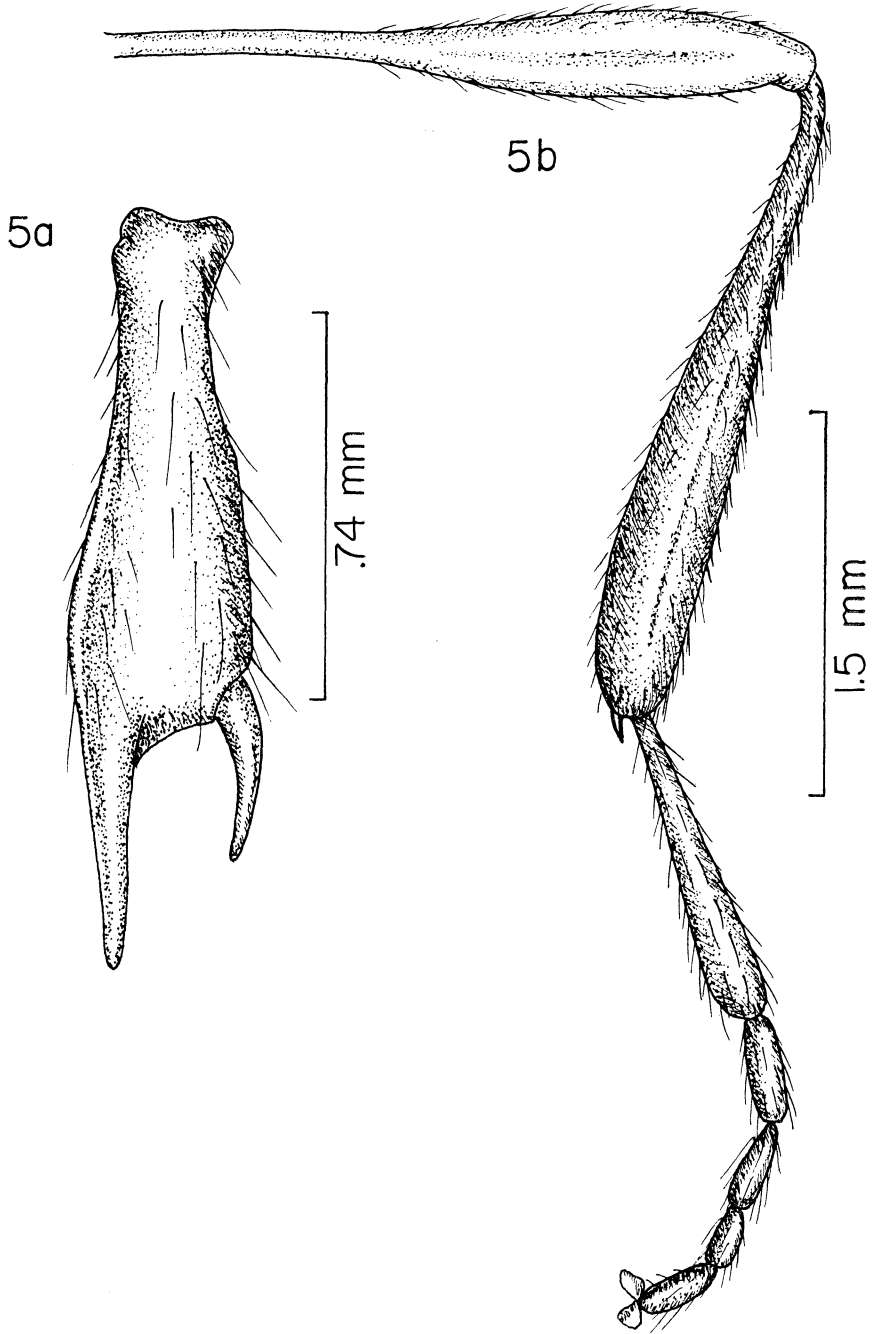


Fig. 5. *Bibio xuthopteron* n. sp.: a, front tibia; b, hind leg.

♂ by having the legs entirely black except for the rufous tibial spurs, rather than having the femora chiefly brownish yellow; and by having the cells in the anterior portion of the wing dark brown, rather than with the wings somewhat yellowish, especially on the anterior margin.

This species is readily differentiated from other known *Bibio* from New Guinea by having the inner spur of the front tibia almost as long as the outer (fig. 6). Thorax and legs are black and the abdomen entirely rufous. Antennae has 8 distinct flagellomeres, the apical portion is probably made up of a fusion of 2 flagellomeres. The front is tinged with yellow to rufous, especially on anterior margin, in some specimens front margin is clear yellow. Rostrum is short, scarcely extended beyond eye margins and tinged with yellow to rufous. Front is smooth, polished, very slightly raised in the middle just above the antennae. Costal, subcostal and radial cells are dark brown, concolorous with stigma. Posterior portion of the wing is comparatively pale yellow-brown with veins just slightly darker than wing membrane. Veins M_2 and M_{3+4} evanesce before reaching the wing margin.

Length: Body, 6.3-7.0 mm; wings, 7.2-7.7 mm.

SPECIMENS EXAMINED: 5♀. NW NEW GUINEA: Wissemmeren, Paniai, 750 m, IX-XI.1939, H. Boschma. These have been returned to the Zoological Museum, Leiden.

***Bibio* new species?**

Male specimens of 2 apparently new species are on hand which would fit near *obediens* by being entirely black, covered with black pile. One differs by having the wings evenly brownish yellow with the basitarsus of the hind legs slender, 6× or more longer than wide and densely long-haired. The other differs by having the wings faintly yellow-brown tinged, darker anteriorly and with the hind basitarsus narrowed at the base, distinctly thickened apically. These are not being described as new.

One species represented by 1♂ specimen is from NE New Guinea: Finisterre Range, Saidor, Sibog Vill., 27.V.-5.VI.1958, W. W. Brandt. And 2♂ specimens of 1 species, 1 damaged, from SE New Guinea: Owen Stanley R., Goilala, Bome, 1950 m, 8-15.III.1958, Brandt. These specimens are in the B. P. Bishop Museum.

Genus *Enicoscolus* Hardy

This genus was described from Mexico (2 species, ref. Hardy, 1961: 81) and this is the only species known from elsewhere in the world. No ♂ specimens of this group have yet been taken, and it cannot be predicted what their characteristics might be.

Enicoscolus is readily differentiated from all other known bibionids by the short, strongly clavate antenna with only 5 flagellomeres; by the thick spine-like setae over the pronotum

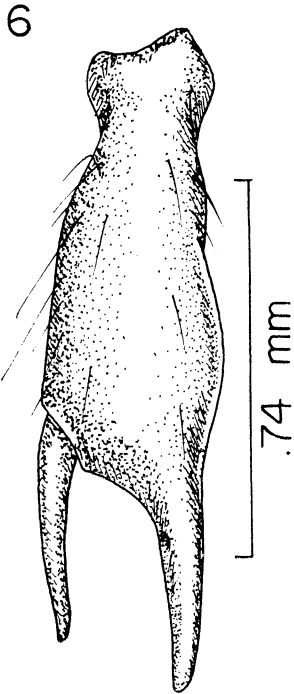


Fig. 6. *Bibio* n. sp. rel. *depressus* de Meijere: front tibia.

tum and anterior portion of pronotum; by the very short front tibia with a large apical spur extending almost equal to the remainder of the segment and with a very tiny rudimentary inner spur; the inner spur is represented by just a bristle-like process; also by lacking the m crossvein and the base of vein M_{3+4} and by having the radial sector thickened at the apex and the basal section of the radial sector very short compared to the r-m crossvein.

Enicoscolus collessi Hardy Fig. 7a-c.

Enicoscolus collessi Hardy, 1962, Pacif. Ins. 4(4): 783, fig. a-d.

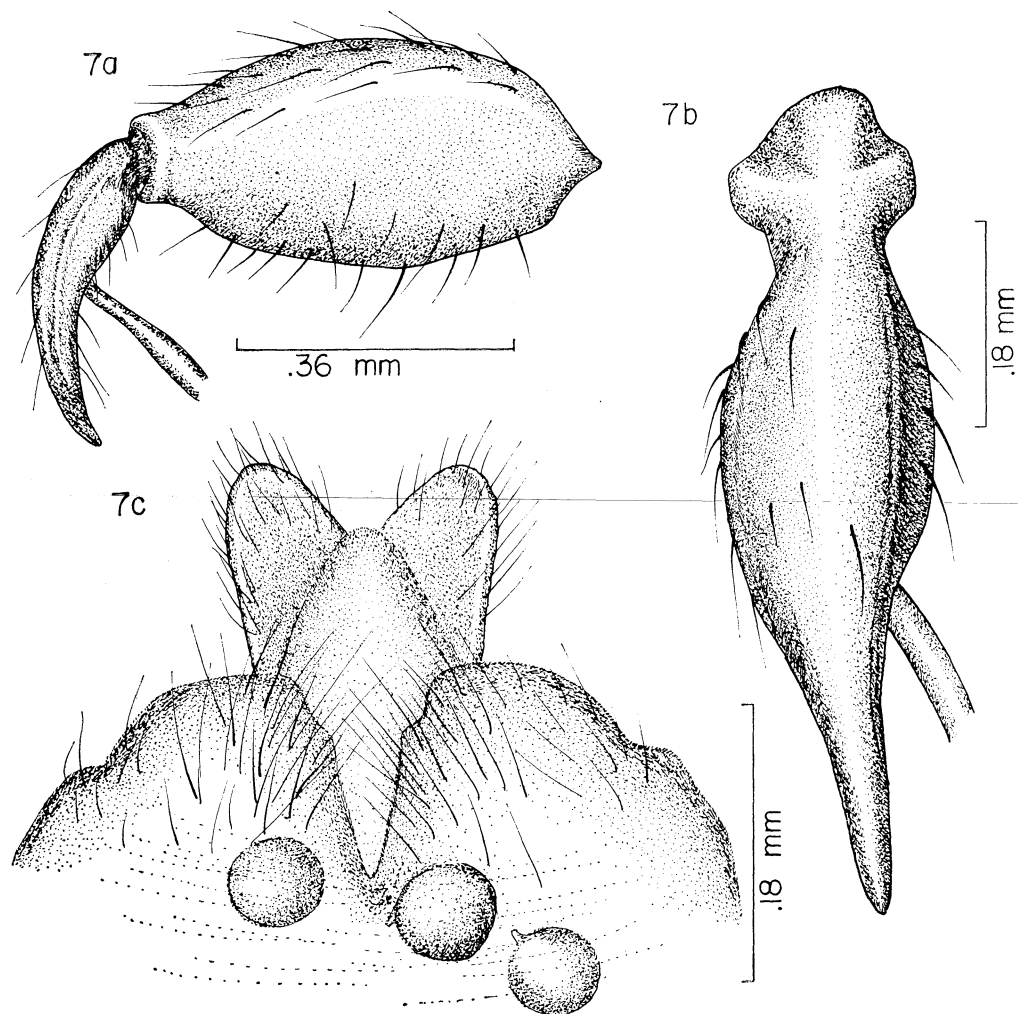


Fig. 7. *Enicoscolus collessi* Hardy: a, front leg, lateral; b, front tibia, dorsal; c apex of ♀ abdomen, ventral.

This remarkable species was described from 1 ♀ specimen from Queensland, Australia. I see no way to differentiate the specimens on hand from New Guinea from *collessi*.

The specimens on hand fit the description of *collessi* in all respects; however, 2 of the 3 specimens have the coxae predominantly rufous, in the other the coxae are dark brown to black, tinged with rufous and this is apparently variable. The original description is adequate for separating this species; however, I made no mention of the very strongly swollen front femur. At least on the specimens on hand, the femur is only 2× longer than wide (fig. 7a). I am unable to find any evidence of an inner spur on the front tibia. A few yellow setae are present on the sides but do not appear representative of the spur. Essentially the entire tibia is developed into 1 large spur as seen from dorsal view (fig. 7a). The egg guides are shaped as in fig. 7c, are rounded at apices and densely pilose. The spermathecae are very small, almost completely circular.

Length: Body, 3.5-3.7 mm; wings, 3.7-4.0 mm.

Type locality Ingham, Queensland, Australia. Type in the CSIRO collection, Canberra.

SPECIMENS EXAMINED: 3, NE NEW GUINEA: Wau, 1200-1250 m, 11.X.-17.X.1965, malaise trap, J. & M. Sedlacek. NW NEW GUINEA: SE Biak I., 1.VII.1962, J. L. Gressitt & J. Sedlacek. Of the specimens 2 are in the B. P. Bishop Museum, 1 is in the University of Hawaii collection.

Genus *Dilophus* Meigen

Only 2 species of this genus have previously been recorded from New Guinea: *exiguus* (Hardy) and *multispinosus* (Hardy). In the collection at hand 5 species are present. Of these 3 are undescribed. Following is a key to the known species of *Dilophus* from New Guinea.

KEY TO DILOPHUS FROM NEW GUINEA

1. Only 2 sets of spines on front tibia, 1 at apex and 1 set of transversely arranged dorsal spines near middle of segment (fig. 8b, 9b), vein M_{1+2} complete 2
 5 or 6 spines above apical set arranged irregularly from basal .33 of segment to about apical .66 (fig. 10b-c).....**exiguus** (Hardy) (complex of spp.?)
2. Rostrum, sclerotized portion of head beyond eyes, short, not extending beyond bases of antennae (fig. 12a) 3
 Rostrum extended conspicuously beyond bases of antennae (fig. 9a). Front tibia with 4 spines arranged transversely near middle. ♂ all black, ♀ with mesonotum, front coxa and often conjunctiva of abdomen rufous.....**dichromatus** n. sp.
3. Entirely black species; front tibia with only 4 spines in row above apex..... 4
 Thorax and at least front coxa and femur predominantly rufous. 5 or 6 spines near middle of front tibia..... **multispinosus** (Hardy)
4. Eyes of ♂ normal. Hind tibia and tarsus of ♂ slightly, but distinctly swollen, as in fig. 8c..... **conformis** n. sp.
 Eyes of ♂ most abnormal, greatly reduced in size, as seen from lateral view the eye size and head shape are almost exactly alike in the 2 sexes (fig. 12a, c). Hind tibia and tarsus slender, almost straight-sided (fig. 12d). ♂ genitalia as in fig. 12e..... **transvestis** n. sp.

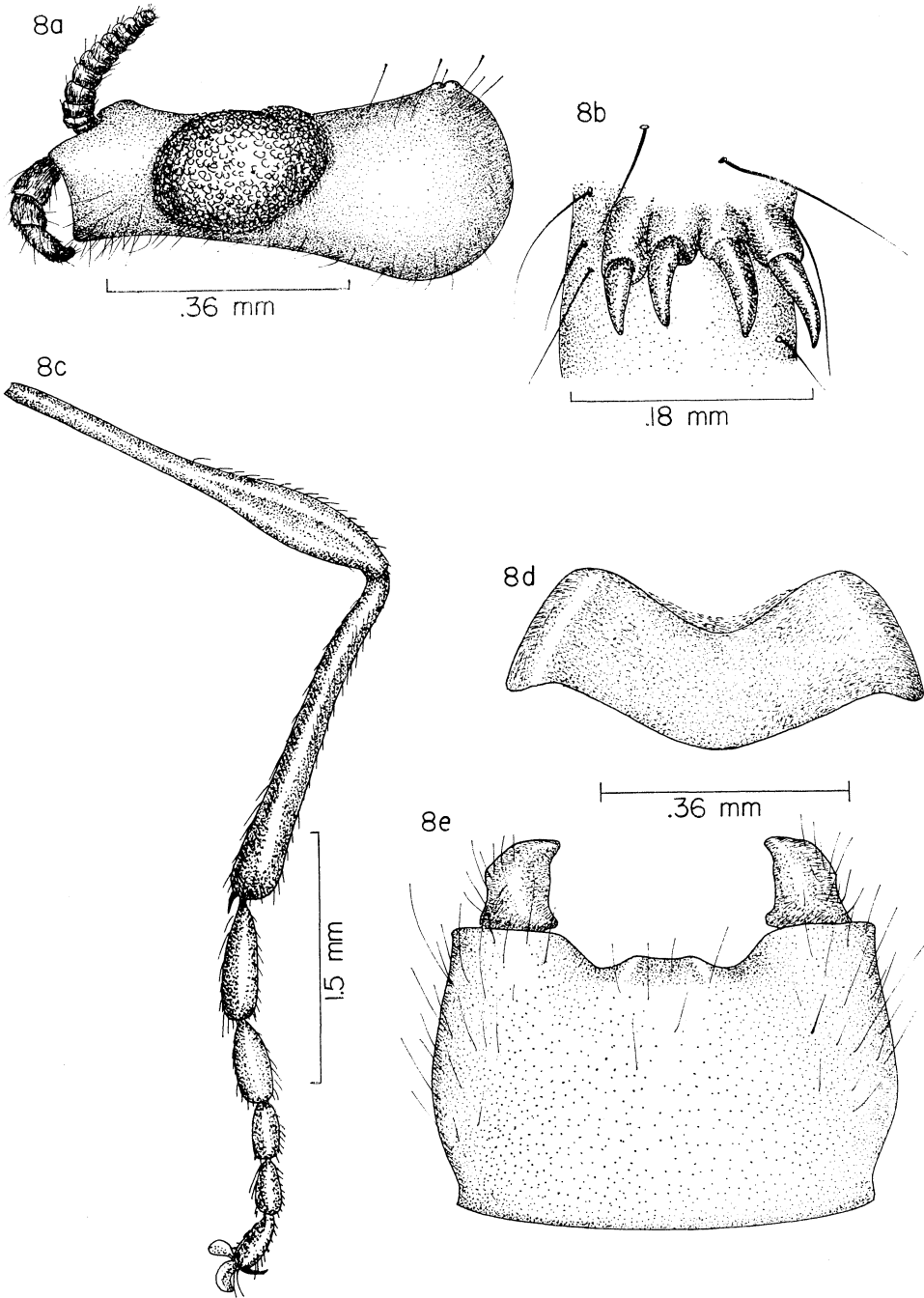


Fig. 8. *Dilophus conformis* n. sp.: a, head of ♀, lateral; b, median row of spines on front tibia; c, hind leg of ♂; d, 9th tergum of ♂, dorsal; e, ♂ genitalia, ventral.

Dilophus conformis Hardy, new species Fig. 8a-e.

A comparatively large all black species which would run imperfectly in my key to Pacific *Dilophus* (Hardy, 1951: 258) to *acutidens* Edwards, from the Philippines. The 2 are obviously not related, however. The ♂ genitalia of *acutidens* as figured by Edwards (1929: 77, fig. 2c) are very different from those of *conformis* (fig. 8e). *D. acutidens* has slightly milky wings, only 6 distinct flagellomeres, the mesonotum, front coxa and femora red and also is smaller, body and wing 3.2-3.5 mm; *D. conformis* is similar in color, size and many other respects to *transvestis* n. sp., and the ♀♀ of these appear very close. The ♂♂ of the 2 are readily separated by the peculiar characteristics of *transvestis* as discussed under that species, also by genital characters (fig. 8e and 12e).

♂. *Head*: Compound eyes sparsely pilose. Antennae entirely black, 11 flagellomeres present, the last 3 closely joined. Last segment of palpus about .50 longer than wide. Rostrum not developed beyond bases of antennae. *Thorax*: Entirely polished black, except for a tinge of rufous on humeri. Mesonotum sparsely haired on sides and hind portion and with a single row of hairs down each dorsocentral line. Halteres dark brown to black. Anterior comb made up of about 6 teeth on each side, these are separated in the middle by a distance equal to the width between 2 teeth. *Legs*: Dark brown to black with a faint tinge of rufous in ground color of coxae and femora. Front tibia with 4 or 5 teeth arranged in a transverse row near middle of segment (fig. 8b). Hind femur attenuated on basal .50. Tibia rather gradually tapered from apex to base; its widest point approximately equal in width to widest point of femur. Basitarsus distinctly swollen but not globose, almost as wide as apex of tibia but approximately 4× longer than its width. Other tarsomeres oblong in shape (fig. 8c). *Wings*: Deeply tinged with brown, slightly darker along anterior margin; stigma dark brown. Anterior veins yellow-brown, posterior veins faintly tinged brownish yellow almost concolorous with wing membrane. Costa extends approximately .50 the distance between apices of Rs and M₁. *Abdomen*: Entirely polished black in ground color, covered with black pile and with gray-brown pubescence over terga. 9th tergum about 2× wider than long and with a broad V-shaped concavity on hind margin (fig. 8d). 9th sternum approximately as long as wide, with a shallow cleft in middle of hind margin. Claspers simple, about 2.5× longer than wide and pointed at inner apices (fig. 8e).

Length: Body and wings, 5.5-6.2 mm.

♀. Eyes oval, portion of head behind eyes approximately equal in length to the eye. Rostrum, portion of head in front of eye, about .50-.66 as long as eye (fig 8a). Front flat, subopaque, microscopically rugose except for the raised portion on anteromedian margin. Thorax tinged with rufous in the ground color.

Length: Body 7.0 mm; wings, 8.5 mm.

Holotype ♂ (Bogor Zool. Mus.), Neth. Ind.-Amer. New Guinea Exped., Lake Habema (NW New Guinea), 3250-3300 m, 12.VIII.1938, L. J. Toxopeus. Allotype ♀, same data as type, 8.VIII.1938. Paratypes, 7♂♂, 3♀♀: same as type; Neth. Ind.-Amer. New Guinea Exped., Scree Val. Camp, 3800 m, 22.IX.1938, L. J. Toxopeus; same expedition, letter box camp, 3600 m, 9.IX.1938, Toxopeus. NW New Guinea: Wisselmeren, Enarotali, 1800-1900 m, 31.VII-4.VIII.1955, light trap, J. L. Gressitt. NE New Guinea: 1♀, Kukumbagl Pass, 2800 m, 6.VII.1955, Gressitt, also apparently belongs here but is slightly aberrant and is not being designated as a paratype. Type returned to the Bogor Zoological Museum, Java. Paratypes deposited in the collections of the B. P. Bishop Museum and the University of Hawaii.

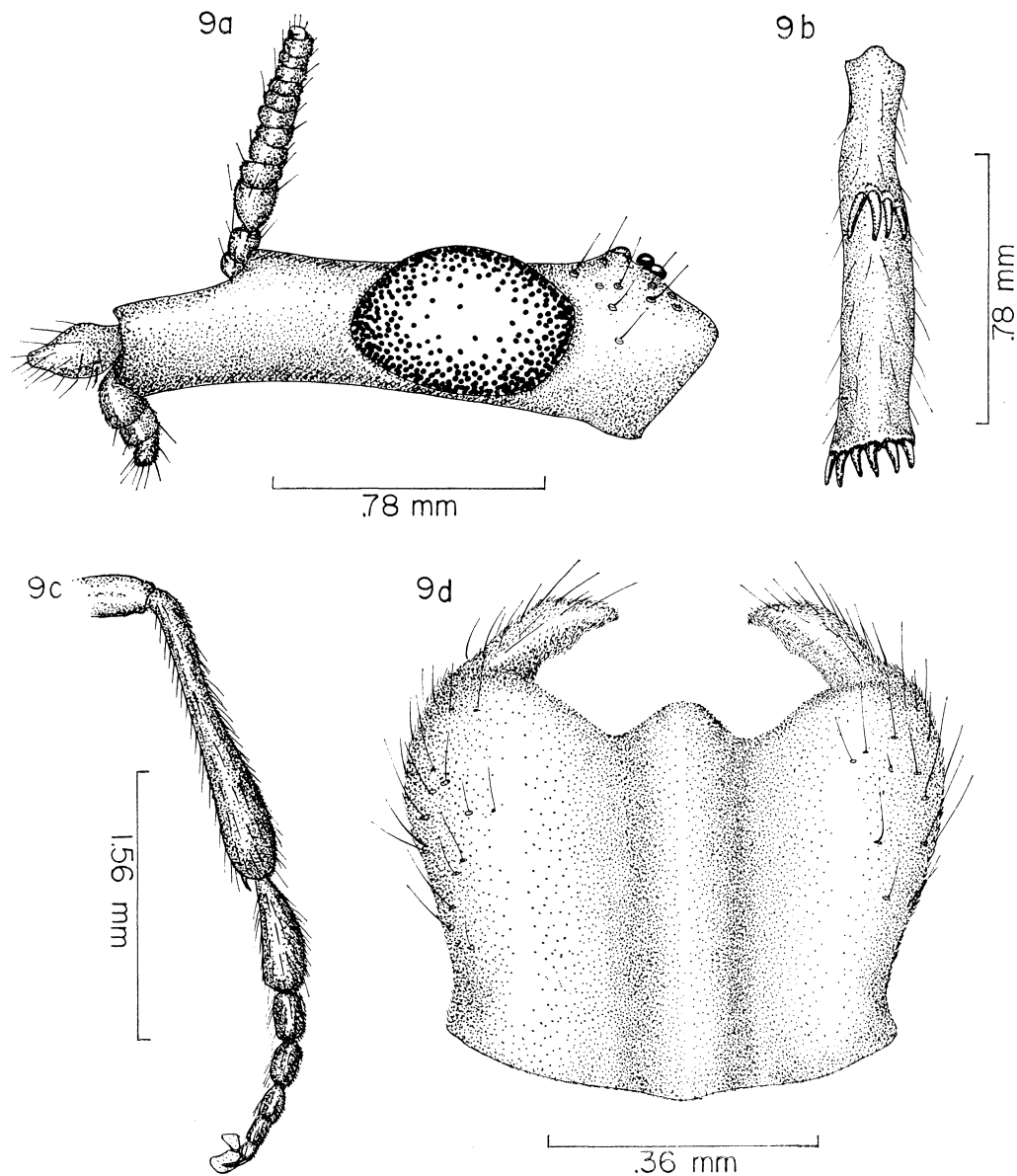


Fig. 9. *Dilophus dichromatus* n. sp.: a, head of ♀, lateral; b, front tibia; c, hind leg of ♂; d, ♂ genitalia, ventral.

***Dilophus dichromatus* Hardy, new species** Fig. 9a-d.

In my key to the Pacific *Dilophus* (1951: 258) the ♂ of this species would run near *varipes* Skuse, from Australia, but differs by having 4 prominent spines near the middle

of the front tibia, by the brownish fumose wings, by not having the hind basitarsus globose, and by the very different genitalia. The ♀ would run to *rostratus* (Hardy) from Australia but differs in having the dorsum of thorax entirely rufous with the pleura brownish red rather than with thorax entirely polished black except for teeth of anterior comb; also by having eyes sparsely haired rather than densely pilose; front femur brown to black, tinged with red, not bright orange; and antenna with 11 flagellomeres, not 9. Both sexes resemble *nigrostigma* (Walker) from New Zealand in body and wing coloration. That species is characterized, however, by having 3 large spines on a prominence at basal .33 of the front tibia and a single spine at apical .66 of the segment, as well as by the striking differences in ♂ genitalia and other details.

♂: *Head*: Rostrum about .66 as long as lower division of eye. Last segment of palpus rather short and broad, .33-.50 longer than wide. Apical .50 of pedicel yellow. Flagellum entirely black, 11 flagellomeres. *Thorax*: Entirely polished black with a faint tinge of rufous in ground color especially on sides of mesonotum and on pleura. Mesonotum sparsely black-haired on sides, a single line of hairs extends down each dorsocentral area, and with scattered hairs over hind portion. Hind portion of scutellum covered with prominent black hairs. Anterior comb consists of about 12 evenly-spaced spines in an almost straight row. Posterior comb is made up of 10-12 short blunt teeth arranged transversally across middle of thorax and with 2 or 3 larger blunt teeth arranged longitudinally along each side. Knobs of halteres dark brown to black, stems yellow. *Legs*: Entirely black except for the brownish-red front coxa and except for a tinge of red on inner margins of the front femur. Front tibia with 4 prominent spines arranged in a transverse row near middle (fig. 9b). Hind tibia clavate, distinctly broader than femur. Hind basitarsus swollen, almost as wide as apex of the tibia but not globose (fig. 9c). The 2nd, 3rd and 4th tarsomeres oblong in shape. *Wings*: Rather strongly tinged with brown, especially along anterior margin. Cells along margin, and stigma dark brown. Anterior veins yellow-brown just slightly darker than membrane. Costa extends about .66 of distance between apices of Rs and vein M₁. *Abdomen*: Shining black covered with gray-brown pubescence and rather thickly brown to black-haired. 9th sternum about as wide as long, posterolateral margins not strongly lobate and posteromedian margin slightly produced (fig. 9d). Claspers blunt, rounded at apices. 9th tergum nearly 2× wider than long; hind margin slightly concave. Cerci large and conspicuous.

Length: Body, 5.4 mm; wings, 5.0 mm.

♀. Rostrum very well developed, distinctly longer than compound eye and approximately equal in length to flagellum of antenna (fig. 9a). Dorsum of thorax rufous except for black pronotum. Scutellum and metanotum brown to black, tinged with red. Pleura predominantly polished black, with tinges of rufous especially on sternopleura and propleura. Front coxa are almost entirely yellow. Legs otherwise black with a tinge of rufous on posterior and anterior surfaces of front femur. Conjunctiva of abdomen on type is yellow to rufous. Terga and sterna brown to black faintly tinged with red. Some of the paratypes have the conjunctiva entirely black and 2 have the abdomen entirely rufous, except in 1 the terminalia are dark brown to black (1 of these appears teneral).

Length: Body and wings, 5.7-6.3 mm.

Holotype ♂ (BISHOP 7748), NE New Guinea: Wau, 1250 m, 24.V.1965, malaise trap, J. & M. Sedlacek. Allotype ♀ (BISHOP) same data as type, 17.V.1965. Paratypes: 3♂♂, 7 ♀♀. NE New Guinea: same data as type, I, II & V.1963, and I & II.1966; and Karimui, S of Goroka, 1000 m, 4.VI.1961, light trap, J. L. & M. Gressitt. NW New Guinea: Star Mts, Sibil Val., 1245 m, 18.X-8.XI.1961, malaise trap, S. & L. Quate; and Neth. Ind.-

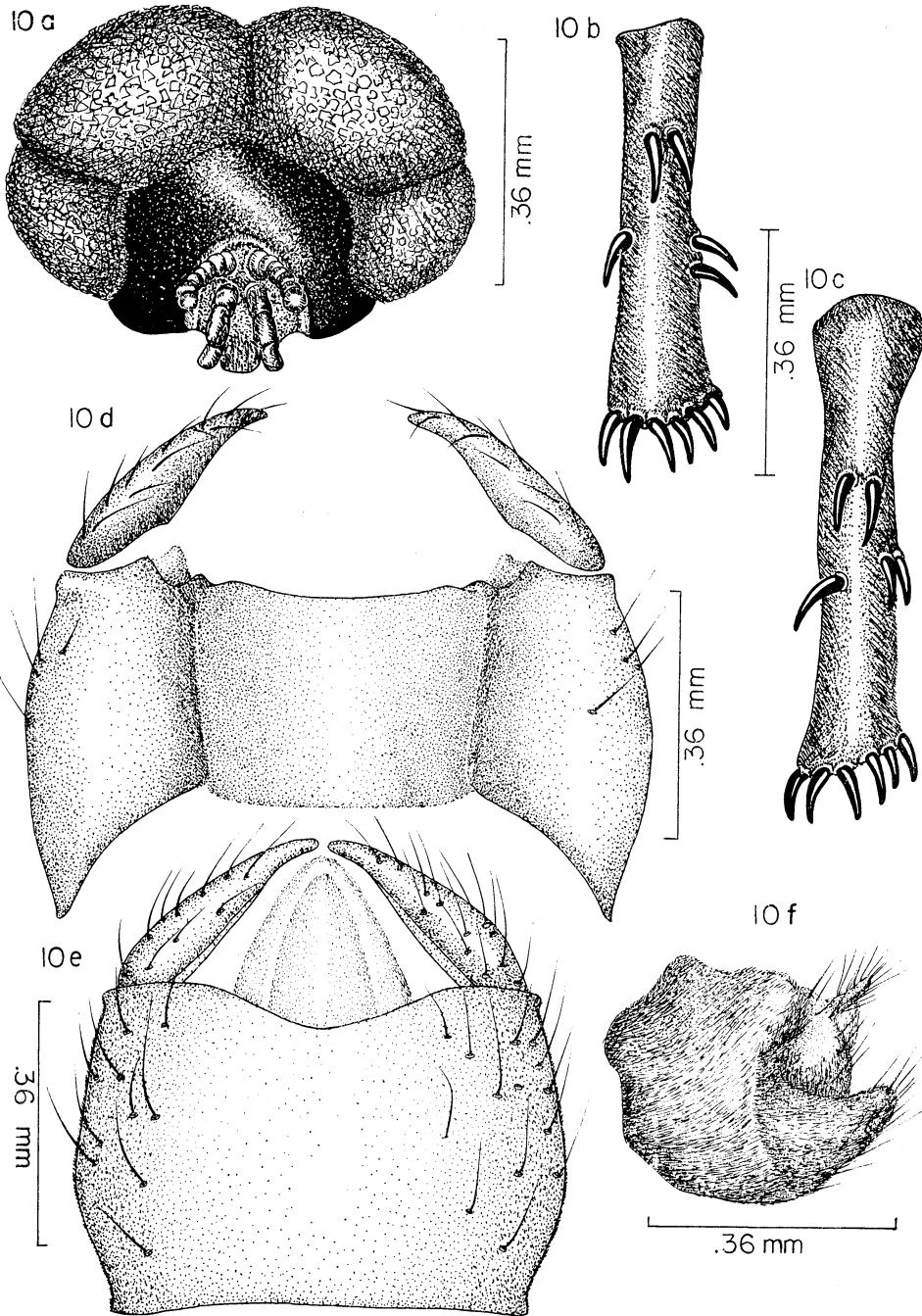


Fig. 10. *Dilophus exiguus* (Hardy): a, ♂ head, frontal view; b-c, front tibiae, showing variations; d-e, ♂ genitalia, ventral, showing variations; f, apex of ♀ abdomen, lateral *in situ*.

Amer. New Guinea Exped., Araucaria Camp, 800 m, 15.III.1939, L. J. Toxopeus. Type, allotype and 4 paratypes in the B. P. Bishop Museum. Five paratypes in the University of Hawaii collection and 1 in the Bogor Museum, Java.

Dilophus exiguus (Hardy), new combination Fig. 10a-f.

Philia exigua Hardy, 1951, Proc. Haw. Ent. Soc. **14**(2): 263, fig. 4a.

A complex of species apparently occurs in New Guinea and the Bismarck Is. which is characterized by being very tiny, slender-bodied, with the base of Vein M_{1+2} lacking, and by having 5 or 6 spines arranged irregularly on the dorsal surface of the front tibia from about the basal .33 to the apical .66 of the segment. Typical *exiguus* has the thorax largely yellow or brownish-yellow, and the front tibia with a pair of closely placed, transversally arranged, dorsal spines near basal .33 of segment, 1 anterodorsal spine near middle and 2 longitudinally arranged posterodorsal spines near apical .66 (fig. 10b-c). It appears that 2 or possibly more distinct species of this complex occur in New Guinea, but because of the inadequacy of specimens available for study, it has not been possible to work out the range of variability of *exiguus* and further collecting is needed before the concept of this species can be clearly understood.

On hand are 3♂ and 1♀ which would differ from the original description of *exiguus* by having the thorax dark brown to black except for the yellow humeral ridges and also the arrangement of the spines on the front tibia is different. Variations are seen, however, in the arrangement of the spines, and it is not known how reliable these are. Species? "A" has the 2 dorsal spines near basal .33 of segment and has 3 spines arranged just beyond middle of segment; 2 rather closely spaced, posterodorsal spines arranged transversally, and 1 isolated anterodorsal just slightly beyond. One specimen on hand has an extra anterodorsal spine situated near the apical .25 of the segment. It may be that *exiguus* is a variable species in color of the thorax and in the arrangement of the spines on the front tibia. The dark-colored specimens on hand are very similar to a new species (Noona Dan Expedition Report, in press) from the Bismarck Is. That species differs strikingly by having the front portions of the eyes expanded, extending to the bases of the antennae so that the lower front is not exposed, very narrow and hardly visible. Also, in the 25 specimens which have been studied from the Bismarcks the arrangement of the spines on the front tibia is constant: 2 close together near basal .33, 2 posterodorsal longitudinally arranged near middle of segment and 1 dorsal spine near apical .66. The dark-colored specimens from New Guinea have the anterior portion of the ♂ eyes shortened, cut off rather abruptly so that a broad strip of the front is exposed between the eye margins and the bases of the antennae; this is polished black and is approximately equal in length to the combined lengths of the scape, pedicel and the 1st flagellomere (fig. 10a). This character was not noted in the original description of *exiguus* and the type will have to be re-examined; if it lacks the broadly exposed lower front, the 2 obviously are different species. The ♂ claspers of the dark-colored specimens are sharp pointed, in 2 of these specimens approximately 2× longer than wide and in 1 specimen the claspers seem more elongate, approximately 3× longer than wide (fig. 10d-e). I see no other reliable characteristics and would hesitate to consider these different species.

The dark-colored specimens (species? "A" *exiguus* complex) are from the following lo-

calities: NW New Guinea: Wisselmeren, 1700 m, Wagete, Tigi L., 17.VIII.1955, J. L. Gressitt and Wisselmeren, Kamo-Debei Div., 1700 m, 14.VIII.1955, Gressitt and 1 damaged specimen. NE New Guinea: Feramin, 150-120 m, 11-22.V.1950, W. W. Brandt.

The original description of *exiguus* is adequate for the ♂.

One ♀ on hand appears to be typical *exiguus*. It is predominantly rufous: the thorax and the legs, excepting the last 4 tarsomeres, are entirely yellow-red. The ventral portion of the head is rufous, tinged faintly with brown and the upper portion is brown to black faintly tinged with red in the ground color. The terga of the abdomen are brown with a faint tinge of red, the conjunctiva and sterna are brownish red, the terminalia are yellow, the last sternum (the plates making up the egg guides) is bilobed as seen from lateral view. The front tibia of the ♀ is as in fig. 10f. Otherwise fitting the description of the ♂.

Length: Body of ♀, 2.9 mm; wings, 3.1 mm.

Type locality Mafulu, Papua (SE New Guinea). Type in the British Museum (Nat. Hist.). The 1 ♀ specimen on hand is from NW New Guinea: Bokondini, 40 km N of Baliem Val., ca 1300 m, 5-11.XI.1961, L. W. Quate. This specimen is in the B. P. Bishop Museum collection.

***Dilophus multispinosus* (Hardy), new combination** Fig. 11a-c.

Philia multispinosus Hardy, 1951, Proc. Haw. Ent. Soc. 14(2): 266, fig. 7a-e.

From the collections it would appear that this is obviously the most common species of Bibionidae found in New Guinea. The collections on hand contain 1300-1500 specimens from approximately 50 localities scattered over the entire island of New Guinea. The species is readily recognized by its all rufous thorax and predominantly red femora, by having the spines of the dorsal set on the front tibia arranged in a transverse row and by its comparatively large size and dark wings; also the short rostrum will help in differentiating this species.

The lower division of the compound eyes of the ♂ is very large, equaling approximately .66 of the size of the upper portion. Antennae have 11 flagellomeres. Rostrum not developed beyond bases of antennae. Thorax all rufous, except with a tinge of brown on upper portions of pleura. Anterior set of combs divided into 2 sets of approximately 6 teeth each. Posterior set consists of 10 to 12 rather small blunt teeth arranged transversally across median portion and about 4 slightly larger teeth arranged longitudinally along each side. Scattered short dark hairs present over sides of mesonotum and a few short hairs present down each dorsocentral line; also posterolateral margins of scutellum have brown to black hairs. Legs predominantly black, front femur yellow to rufous except for brown to black apices, other femora yellow to rufous, lightly tinged with brown and with apices broadly brown to black. Present are 5 or 6 spines in a transverse row on dorsal surface of front tibia near basal .40 of segment. Number of spines varies from 4 to 7 in specimens which have been examined. Some specimens with middle and hind femora chiefly brown, tinged with yellow on basal .50 to .75. Wings tinged with brown (this is much darker in the ♀). The species has been adequately described in the original. The large series of specimens on hand shows considerable variation in size as well as in the genital characters. The ♂ specimens vary in body size from approximately 4.0 mm to 7.5 mm with the wings 4.5 to 8.5 mm. The ♀ body varies from 4.5 to 7.5 mm with wings 6.0 to 9.3 mm. The ♂ genitalia of the large and small species appear to show rather consistent differences although these are slight and in studying a series of specimens they do seem to

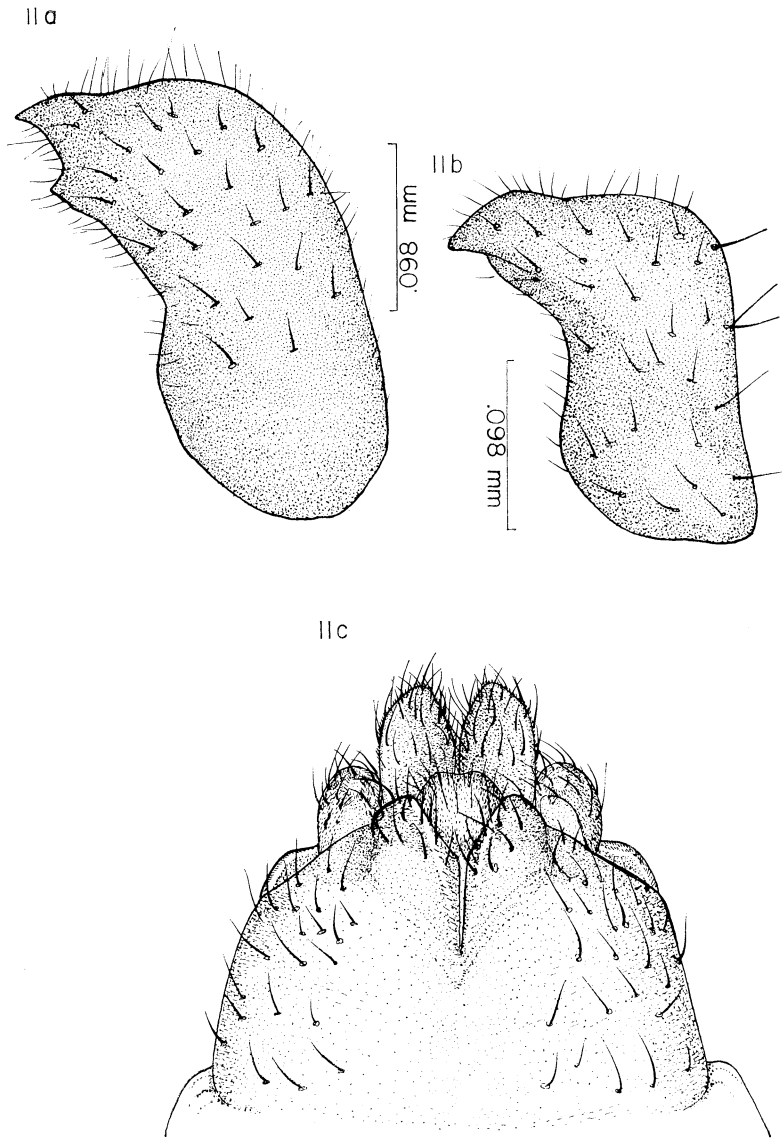


Fig. 11. *Dilophus multispinosus* Hardy: a-b, claspers, lateral, showing variations; c, egg guides of ♀, ventral.

intergrade; in the larger specimens which have been studied, each clasper has a small subapical indentation (fig. 11a); in the small species this is not present (fig. 11b). Also, there appear to be slight differences in the shape of the concavity on the hind margin of the 9th tergum, but I do not feel that these characters are of any significance and would consider this a polymorphic species. The ♀ egg guides are as in fig. 11c.

Type locality Mt Tafa, SE New Guinea. Type in the British Museum (Nat. Hist.).

This species is known only from New Guinea.

Dilophus transvestis Hardy, new species Fig. 12a-e.

The ♂♂ of this species are remarkably modified. The head as seen in direct lateral view is ♀ in all respects; from this view, it is difficult to tell the sexes apart (fig. 12a, c). I know of no other bibionid which has such a strange modification, and the first specimen of this that I saw I set aside as a most unusual freak individual. The color, size and general details resemble those of *conformis* and the 2 would appear to be related species. Besides the unusual differences in the head characteristics, however, the hind tibia and tarsi of *transvestis* ♂♂ are not swollen, and the genitalia differ in the 2 as shown in fig. 8e and 12e.

♂. *Head*: As seen from lateral view the compound eye is oblong in shape, about .50 longer than portion of head behind eyes and nearly 3× longer than sclerotized portion of head in front of eyes (fig. 12a). In dorsal view, compound eyes divided into 2 portions on each side; a smaller section of facets covers most of front and these do not completely meet down the middle (fig. 12b). Lower median portion of front raised, carinate, as in the ♀. Antennae black except for a tinge of yellow on apices of pedicel and with 12 flagellomeres, last 2 closely joined. Last segment of palpus about 2× longer than wide. *Thorax*: Entirely polished black, except for yellow humeral ridges, tinged faintly with rufous in ground color. Knobs of halteres brown, stems pale. Sides of pronotum rather densely yellow pilose; dorsum otherwise with few scattered short pale hairs down sides of mesonotum, and with short inconspicuous seta around the margin of scutellum. Anterior comb with about 6 teeth on each side, separated in middle by a space about equal in width to distance between 2 of the teeth. Posterior comb made up of 10 to 12 short teeth arranged in a transverse row and with about 3 teeth arranged longitudinally on each side. *Legs*: Predominantly shiny black, tinged with rufous in ground color, especially on coxae, femora and tibiae. Front tibia with 4 or 5 dorsal spines arranged near middle of segment, very similar to those of *conformis*. Hind femur clavate, similar in shape to that of *conformis*, hind tibia almost straight-sided, just slightly enlarged apically. Tarsi slender, tarsomeres straight-sided, basitarsus about .33 as long as tibia (fig. 12d). *Wings*: Very similar to those of *conformis* with posterior veins darker, yellow-brown, distinctly darker than membrane. *Abdomen*: Short and thick, compared to that of *conformis* usually slightly expanded on posterior portion as seen in direct lateral view. Genitalia larger than those of *conformis*, posterolateral lobes of 9th sternum even less developed and a distinct median gibbosity is present on hind margin of sternum. Claspers curved inward at their apices, shaped as in fig. 12e.

Length: Body, 5.7 mm; wings, 7.3 mm.

♀. Compound eyes slightly smaller than those of the ♂ as seen in direct lateral view (fig. 12c) with hind part of head about equal in length to eye and portion of head in front of eye about .66 as long. I see no way to separate the ♀♀ from those of *conformis*.

Length: Body, 7.6 mm; wings, 8.7 mm.

Holotype ♂, Neth. Ind.-Amer New Guinea Exped., Scree Val. Camp, 3800 m, 27.IX.1938, L. J. Toxopeus. Allotype ♀, same data as type, 14.IX.1938. Paratypes, 8♂, 3♀, mostly same data as type, 6-27.IX.1938; also from Letter Box Camp, 3600 m, 4-9.IX.1938, L. J. Toxopeus. Type and some paratypes returned to the Zoological Museum, Bogor, Java. Paratypes deposited in the B. P. Bishop Museum and the University of Hawaii collections.

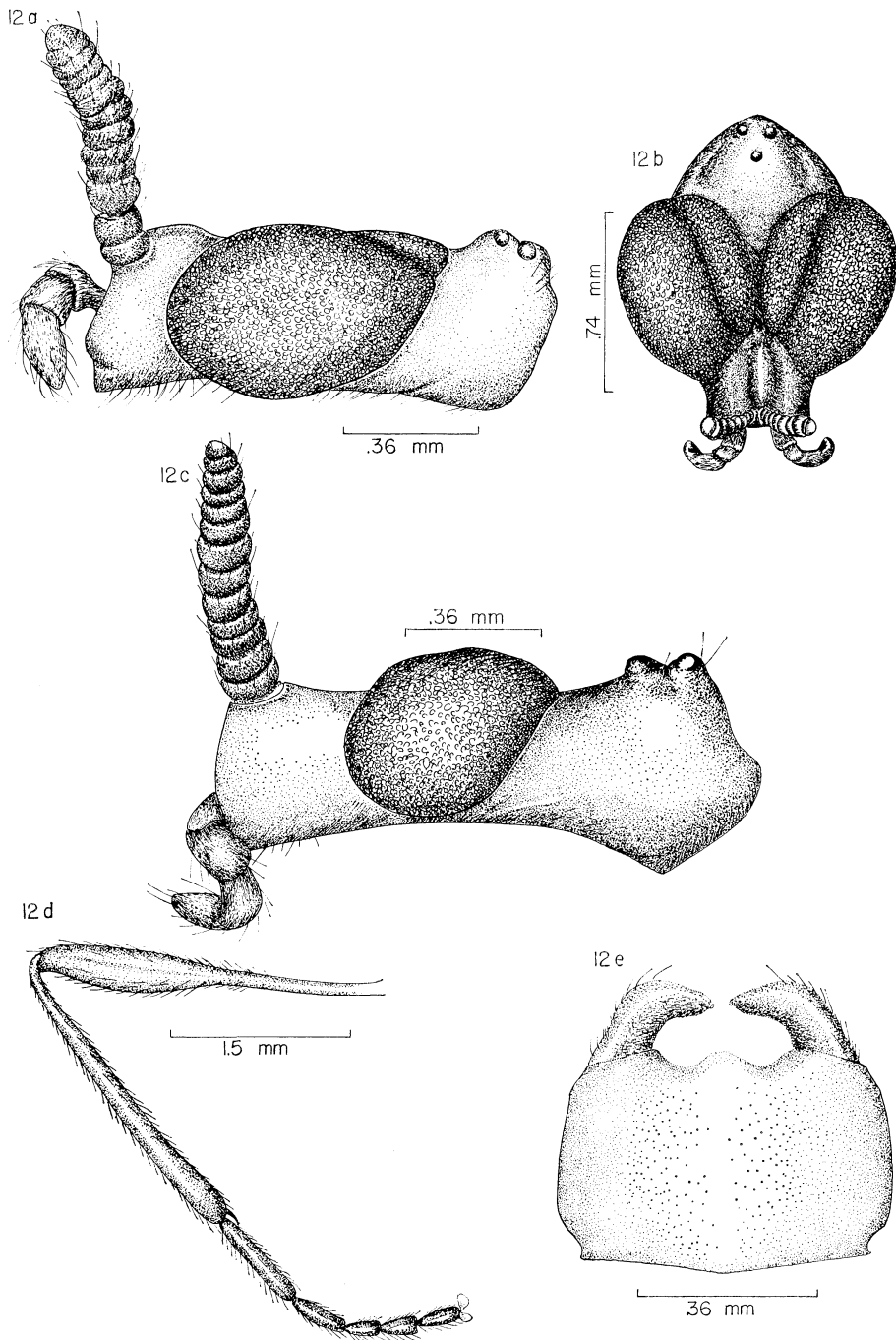


Fig. 12. *Dilophus transvestis* n. sp.: a, head of ♂, lateral; b, head of ♂, dorsal; c, head of ♀, lateral; d, hind leg of ♂; e, ♂ genitalia, ventral.

Genus *Plecia*

This group is highly developed in New Guinea with 34 species of *Plecia* (*Plecia*) (24 are new) and 1 *Plecia* (*Heteroplecia*). The ♂ genitalia are greatly diversified and provide the only reliable characters for separating species; body coloration is of little importance. Four species complexes are present in New Guinea, these are related to Indomalasian species but a high degree of endemism occurs, especially in the *decora* and *rufithorax* complexes. Following is a discussion of these groups:

Plecia decora complex

This complex is highly developed in New Guinea. Sixteen species are presently being recorded from this island; 13 are new species. Outside New Guinea the complex is represented by *P. forcipata* Edwards from Malaya, *P. forcipata* Osten-Sacken described from Sumatra but has previously been recorded from New Guinea and Christmas I., and *P. morosa* Edwards from Java.

The complex is characterized by the very highly developed 9th tergum of the ♂. Tergum is usually strongly lobate, often forcipate, and usually extends at least 2× longer than sternum. The inner, ventral, surface of each lobe of the tergum with patches or dense coverings of closely-placed black hairs; these are often flattened, scale-like and are usually branched at their tips as seen under high magnification. The lobes are completely divided except for a very narrow bridge connecting them posteriorly and they are obviously moveable and are used as clasping structures. This has been demonstrated by observing specimens *in copula*, such specimens show the tergum of the ♂ completely surrounding (enclosing) the apex of the ♀ abdomen. The complex is further characterized by the comparatively short, broad sternum and by the rather slight development of posterolateral and submedian lobes on the sternum (fig. 22c). One of the remarkable features of this complex is that body coloration is apparently of no importance as a species group character. Typical *decora* and some related species have the thorax predominantly dull reddish with 3 brownish-red vittae extending down the mesonotum and the wings are usually much paler in color than in most species of *Plecia* with the stigma much darker than the wing membrane. Other species have the thorax reddish brown, usually paler around the margin of the mesonotum; others have the thorax entirely black, while still other species have the thorax entirely orange. The wings of a number of the species are evenly brown fumose, in some the wings are subhyaline with distinct gray spots along some of the veins and over some of the crossveins (fig. 42a). The following species belong in this complex: *affinidecora* n. sp., *amplipennis* Skuse, *bifida* n. sp., *bisulca* n. sp., *curtispina* n. sp., *decora* Hardy, *duplicis* n. sp., *hamata* n. sp., *magnispina* Hardy, *obtusilobata* n. sp., *propeforcipata* n. sp., *propria* n. sp., *serrifera* n. sp., *spilota* n. sp., *stricta* n. sp., and *trifida* n. sp.

Plecia disjuncta complex

This complex of rather small, all black species is characterized by having the tergum short, not extending beyond the sternum or the claspers, completely divided into 2 separate plates which are joined in the middle by a membranous area and broadly expanded

laterally so that from lateral view each plate of the tergum is bilobed and is as wide or wider than the sternum. Each plate of the tergum has a dense patch of flat forked scales on the ventral side at the apex and the inner margin of each plate has a prominent row of teeth near the posterior edge and has the anterior margin developed into a bilobed, heavily sclerotized, dentate black process which extends into the genital chamber at the sides of the aedeagus. The 9th sternum has prominent posterolateral lobes and the claspers are well developed (ref. to figures of the genitalia under the species discussed.) Also the antennae of the ♂ have only 5 flagellomeres.

The following species from New Guinea belong to this complex: *disjuncta* Hardy, *monticola* Hardy and *tetrascolata* n. sp.

Plecia fulvicollis-aruensis complex

This complex is characterized by having the posteromedian margin of the 9th sternum developed into a median process which is usually heavily sclerotized or 9th sternum with prominent submedian lobes on hind margin (*aruensis*). The group is best developed in the Philippines and Indonesia and has been discussed in a monograph on Philippine Bibionidae by Hardy & Delfinado (in press). The following 5 species are known from New Guinea: *aruensis* Edwards, *intricata* n. sp., *multilobata* n. sp., *obtusicornis* n. sp., and *oculastra* n. sp.

Plecia ruficornis complex

This complex is characterized by having the 9th tergum short, not expanded laterally and the sternum lobate on posterolateral margins and with well-developed submedian lobes on hind margin; these arise from the ventral surface in typical *ruficornis* but arise from the dorsal edge of the sternum above the claspers in some species. The complex extends from the Bismarck Islands, through the Philippines, Indonesia and Malaysia; it appears to be best developed in New Guinea. Ten species are presently known, 5 are n. spp.: *acuminata* n. sp., *crenula* n. sp., *cuspidata* n. sp., *diversa* Hardy, *fumidula* Edwards, *inconspicua* Hardy, *lieftincki* Hardy, *malayaensis* Hardy, *patula* n. sp., and *rhinigera* n. sp.

KEY TO PLECIA OF NEW GUINEA

1. Ocelli present, situated on a prominent raised triangle **Plecia (Plecia)**.....2
 Ocelli and ocellar triangle lacking. Eyes of ♂ joined on front to vertex. ♂ genitalia as in fig. 45a, 45b **Plecia (Heteroplecia) visenda** Hardy
- 2 (1). 9th tergum strongly developed, divided into 2 complete plates, often forcipate, whose lobes extend at least 2× length of 9th sternum and which bear dense patches of short, thick, scale-like setae on inner surface. These are usually microscopically bifid or trifold (fig. 22c, 25c, 34c, 42d) 3
 9th tergum not extending beyond apices of sternum or claspers, sometimes with dense patches of black setae (cf. *disjuncta* complex) 16
- 3 (2). Lobes of 9th tergum well developed, equal or longer than remainder of tergum (fig. 25b, 42b). Claspers usually with secondary dorsal lobes. Thorax variable in coloration from black to orange 4
 By comparison, lobes of tergum poorly developed and not over .50 as long as remainder of tergum and shaped as in fig. 38a. Claspers simple, lacking secondary lobes (fig.

- 38b). Small (body, 2.75 mm; wing, 3.9 mm) reddish brown to black species
 **propria** n. sp.
- 4 (3). Each plate of 9th tergum divided into 2 prominent lobes (fig. 18a, 25a) 5
 Plates of tergum not bilobate (fig. 41a, 42b) 8
- 5 (4). Both pairs of lobes of tergum sharp-pointed and conspicuous from dorsal view (fig. 25a) 6
 Lobes of tergum obtuse, posterolateral lobes partially hidden in dorsal view (fig. 34a) 17
- 6 (5). Submedian lobes of tergum equal in size to posterolateral lobes (fig. 25a). Claspers with dorsobasal lobes (fig. 25b). Thorax all orange **duplicis** n. sp.
 Submedian lobes much smaller than posterolateral (fig. 18a). Claspers with subapical dorsal lobes (fig. 18c). Thorax predominantly or entirely black **bisulca** n. sp.
- 7 (5). Claspers elongate, slender, longer than 9th sternum (fig. 34c), and not strongly curved inwardly at apices; with small rounded dorsobasal lobe (fig. 34b). Posterolateral lobes of sternum prominent **obtusilobata** n. sp.
 Claspers shorter than sternum (fig. 17c); curved inwardly at apices and with a large dorsobasal lobe (fig. 17b). Posterolateral lobes of sternum less prominent... **bifida** n. sp.
- 8 (4). Posterolateral lobes of 9th tergum gradually tapered to subacute point at apices, inner surfaces of tergum densely covered with black, flat, scale-like, microscopically branched setae (fig. 42d) 9
 By comparison, the posterolateral lobes are swollen and but slightly tapered (fig. 22a), except possibly at extreme apices and are black setose on inner surfaces of lobes, with a dense brush of closely placed black coarse hairs (scale-like) on each side of median cleft (fig. 40a); also with a preapical clump of black scales below apical point in *magnispina* (fig. 30a) 13
- 9 (8). Wings faintly spotted, largely subhyaline with gray marks along some veins and in cubital cell (fig. 42a). Thorax dark-colored, predominantly brown to black 10
 Wings not spotted. Thorax orange 11
- 10 (9). Claspers slender, longer than remainder of 9th sternum (fig. 42d), with an acute dorsobasal lobe as seen in lateral view (fig. 42c). Lobes of 9th tergum longer, more distinctly tapered, about equal in length to basal portion (median cleft) of tergum (fig. 42b) **stricta** n. sp.
 Claspers shorter than remainder of sternum (fig. 41c) and with a blunt, rounded dorsobasal lobe (fig. 41b). Lobes of 9th tergum short, only slightly tapered and shorter than base (median cleft) of tergum (fig. 41a) **spilota** n. sp.
- 11 (9). Clasper hook-like at apex, lacking secondary lobe (fig. 27b). Lobes of 9th tergum abruptly tapered as in fig. 27a 12
 Claspers not bent inwards at apices and with a large dorsobasal lobe (fig. 14b). Lobes of 9th tergum rather evenly tapered (fig. 14a) **affinidecora** n. sp.
- 12 (11). Claspers lacking dorsal lobes (fig. 27b). Claspers slender, tapered to narrow apices as seen in ventral view (fig. 27c.). Lobes of tergum pointed at apices (fig. 27a, d) **hamata** n. sp.
 Each clasper with broad dorsobasal lobe (fig. 37b), straight-sided, thicker than above as seen in ventral view (fig. 37c). Lobes of tergum rounded at apices (fig. 37a) **propeforcipata** n. sp.
- 13 (8). Lobes of 9th tergum ending in strong apical spine, sharply pointed (fig. 30a); clasper with small dorsobasal lobe shaped as in fig. 20d, 30c, 40d; or with a preapical dorsal lobe (fig. 20d). Posterolateral margins of sternum as in fig. 20c, 30c, and 40c. Well developed lobes on posterolateral margins of sternum 14
 Lobes of 9th tergum not spine-like at apices, usually blunt. Clasper with a large

- dorsobasal dorsal lobe about equal to apical lobe of clasper. Posterolateral margins of sternum slightly developed (fig. 22c). Inner surface of 9th tergum with subbasal clump of spicules **decora** Hardy
- 14 (13). Lobes of 9th tergum comparatively short and straight-sided, not longer than remainder of tergum and with a dense clump of black spicules on inner margin just below apical spine (fig. 30a). Lobes of posterolateral margins of sternum slender (fig. 30c). Claspers curved inward at apex, not serrate and each with a large dorsobasal lobe (fig. 30b)..... **magnispina** Hardy
- Lobes of tergum distinctly longer than remainder of tergum, curved inward, and lacking the dense clump of stubby black hair on inner preapical surface of each lobe 15
- 15 (14). Clasper with small dorsobasal lobe and serrated on dorsoapical edge (fig. 40d). Pointed at apex as seen from ventral view (fig. 40c). Posterolateral lobes of sternum divergent..... **serrifera** n. sp.
- Clasper with prominent preapical dorsal lobe and not serrated (fig. 20d). Posterolateral margins of sternum not divergent..... **curtispina** n. sp.
- 16 (2). 9th sternum with a pair of prominent submedian lobes which hide the small inconspicuous claspers (fig. 16b). Posterolateral lobes lacking on sternum; Indonesia, New Guinea, Bismarck Is., Philippine Is. **aruensis** Edwards
- Not as above 17
- 17 (16). 9th sternum with a large, broad, heavily sclerotized median projection which is sometimes extended on each side of apex (fig. 29c, 32c, 35d)..... **fulvicollis** complex..... 18
- 9th sternum lacking such a process, with not more than a semimembranous rounded gibbosity at middle of hind margin of sternum 21
- 18 (17). All black species.....19
- Thorax entirely orange. ♂ genitalia as in fig. 29a-c, with posterolateral margins of median projection extended into slender, inwardly directed arms and with a large clavate dorsal lobe developed from each posterolateral lobe of sternum which is larger than apical lobe..... **intricata** n. sp.
- 19 (18). Median projection of sternum developed on posterolateral margins into prominent inwardly directed lobes. Posterolateral lobes of sternum each with a large dorsal lobe (fig. 32a-c)..... **multilobata** n. sp.
- Median projection may be produced on posterolateral margins but these lobes are blunt, not directed inwardly (fig. 35d), posterolateral lobes simple..... 20
- 20 (19). Median projection of sternum produced laterally at apex into a pair of eye-like stalks, hind margin slightly concave (fig. 35d). Posterolateral lobes of sternum straight-sided, slightly curved and blunt at apices **oculastra** n. sp.
- Median projection produced posteriorly into blunt lobes separated by a broadly U-shaped concavity. Posterolateral lobes tapered, pointed at apices (fig. 33c) **obtusicornis** n. sp.
- 21 (17). 9th tergum expanded laterally so that as seen from lateral view it is developed into 2 rounded lobes (fig. 23b) and is equal or wider than sternum. 9th tergum completely divided into 2 plates, each bears a dense patch of black, branched scales on inner surface. Sternum with subapical well-developed posterolateral lobes as in fig. 23c, 31c, 43d. All black species..... **disjuncta** complex.....22
- Not as above. If tergum has black, closely massed scales, the entire ventral surface of each lobe is covered and the genitalia are very different; refer to *amplipennis* Skuse. Predominantly black species with rufous thorax or marked with rufous..... 24
- 22 (21). Posterolateral lobes of sternum and claspers simple (fig. 23c, 31c), the latter fold down into genital chamber.....23

- Posterolateral lobes of sternum and claspers each bearing a strong, pointed dorsal lobe (fig. 43 c-e). Basal portions of claspers prominent from ventral view and posterolateral lobes pointed (fig. 43d)..... **tetrascalata** n. sp.
- 23 (22). Posterolateral lobes of sternum broad and rounded, serrated on inner apices and over 2× wider than claspers (fig. 23c)..... **disjuncta** Hardy
- Lobes of sternum slender, sharp-pointed and slightly curved inward at apices, lobes not wider than clasper (fig. 31c)..... **monticola** Hardy
- 24 (21). 9th sternum very short and broad, 3-4× wider than long. Claspers large, flattened as in fig. 15b. 9th tergum with a dense covering of black microscopic scales on each side (fig. 19a); widespread, Queensland, Australia; Bismarck Is.; Indonesia; Solomon Is. and New Guinea..... **amplipennis** Skuse
- Not as above 25
- 25 (24). Claspers bilobed (fig. 44b). 9th tergum with broadly rounded lobes, very densely covered with 3-tined scales on inner surface. Posterolateral margins of sternum only slightly produced (fig. 44c)..... **trifida** n. sp.
- Not as above.....26
- 26 (25). Posterolateral margins of 9th sternum rather strongly produced, extending well beyond apices of claspers (fig. 39c). 9th tergum cleft nearly to base on hind margin..... **ruficornis** complex.....27
- Posterolateral margins of sternum scarcely produced, not lobate. Claspers extending 2× their length beyond hind margins of sternum. 9th tergum gently concave on hind margin, the concavity less than .50 the length of segment (ref. to fig. 16a-c, Hardy, 1958 : 206)..... **lieffincki** Hardy
- 27 (26). Posterolateral lobes of sternum parallel-sided, each with a beak-like preapical point on inner side (fig. 39c). Claspers each with a broad dorsal lobe as seen in side view (fig. 39d)..... **rhinigera** n. sp.
- Not as above 28
- 28 (27). Claspers longer than wide, each with a prominent preapical point on inner margin (fig. 21d)..... **cuspidata** n. sp.
- Not as above 29
- 29 (28). Posterolateral lobes of sternum short, about .25 as long as remainder of sternum and about equal in length to semimembranous area near hind margin of sternum. Sternum, not counting posterior lobes, scarcely wider than long. Lobes broad, sharp-pointed (in *acuminata*), rounded, or slightly bilobed at apices (fig. 13c, 19c, 36c).....30
- Posterolateral lobes more elongate, slightly incurved and at least .50 as long as remainder of sternum, usually almost equal. Sternum, minus lobes, much wider than long (fig. 24c, 26c). Lobes sharp-pointed except in *ruficornis* which is characterized by having clasper longer than wide, etc. 32
- 30 (29). Posterolateral lobes broadly rounded at apices, as seen in lateral view (fig. 36b). Claspers longer than wide (fig. 36c)..... **patula** n. sp.
- Posterolateral margins sharp-pointed (fig. 13b) or indented at apices (fig. 19b). Claspers wider than long, rather truncate apically (fig. 19c) 31
- 31 (30). Posterolateral lobes of 9th sternum tapered, pointed at apices as seen in ventral and lateral views (fig. 13b-c). Submedian lobes of sternum plainly visible from ventral view **acuminata** n. sp.
- Posterolateral lobes rather straight-sided, blunt and indented at apices (fig. 19b-c). Submedian lobes hidden from ventral view **crenula** n. sp.
- 32 (29). Posterolateral lobes of sternum pointed apically (fig. 24c, 26c). Claspers wider than long 33
- Posterolateral lobes rounded at apices. Claspers longer than wide; Indonesia, Philippine Is..... **ruficornis** Edwards

- 33 (32). At least mesonotum rufous 34
 Entirely black species. Genitalia as in fig. 26a-c; Borneo and New Guinea.....
 **fumidula** Edwards
- 34 (33). Thorax entirely orange. Genitalia as in fig. 24a-c; Bismarck Is., Philippine Is., New
 Guinea..... **diversa** Hardy
 Pleura dark brown to black, mesonotum orange. Genitalia as in fig. 28a-c 35
- 35 (34). 9th tergum with a deep V-shaped cleft almost to its base. Posterolateral lobes of
 tergum evenly tapered, subacutely pointed at apices (fig. 28a-b); New Guinea.....
 **inconspicua** Hardy
 9th tergum with a broadly U-shaped cleft. Posterolateral lobes broad, almost trun-
 cate at apices; Thailand, Malaya, Philippine Is. **malayaensis** Hardy

Plecia acuminata Hardy, new species Fig. 13a-c.

A rather small species with thorax entirely bright orange which fits in the *ruficornis* complex but because of the short posterolateral lobes of the 9th sternum would fit near *crenula* n. sp. It is differentiated by having the posterolateral lobes tapered, pointed at apices as seen in both ventral and lateral views (fig. 13b-c). In *crenula* the posterolateral lobes are rather straight-sided, blunt and indented at apices (fig. 19b-c). Also the submedian lobes of the sternum are plainly visible from ventral view in *acuminata* and are small and hidden by the claspers as seen from ventral view in *crenula*. Also the median projection on the hind margin of the sternum is semi-membranous in *acuminata* and is heavily sclerotized in *crenula*.

♂. Fitting the description of other members of this complex with the exception of the ♂ genitalia. The genitalia are as described above and as shown in fig. 13a-c.

Length: Body and wings, 3.5 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7749), SE New Guinea: Woodlark I. (Murua), Kulumadau Hill, 12.III.1957, W. W. Brandt. Type in the B. P. Bishop Museum.

Plecia affinidecora Hardy, new species Fig. 14a-c.

A member of the *decora* complex which has the thorax entirely orange and wings evenly tinged with brown. Because of the gradually tapered lobes of the 9th tergum and densely scaled ventral surface of the tergum this would run near *hamata* n. sp. The claspers are very different in the 2 species, however, as shown in fig. 14c and 27c. And the lobes of the 9th tergum are differently shaped (fig. 14a, 27a).

The wings are rather dark, evenly smoky brown tinged, darker than in most species of this complex and with the stigma hardly differentiated. Lobes of 9th tergum evenly tapered, acutely pointed as seen in dorsal view and subacute as seen in ventral view (fig. 14a, c). 9th sternum scarcely over .33 as long as tergum and almost 4× wider than long. Posterolateral and submedian lobes of sternum well developed. Claspers rather short, rounded at apices (fig. 14c). As seen from lateral view the apex of the clasper is not bent inward and a large pointed dorsobasal lobe is present (fig. 14b).

Length: Body, 4.3 mm; wings, 5.6 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7750), NE New Guinea: Wau, Morobe Distr., 1230 m, 26.VI.1965,

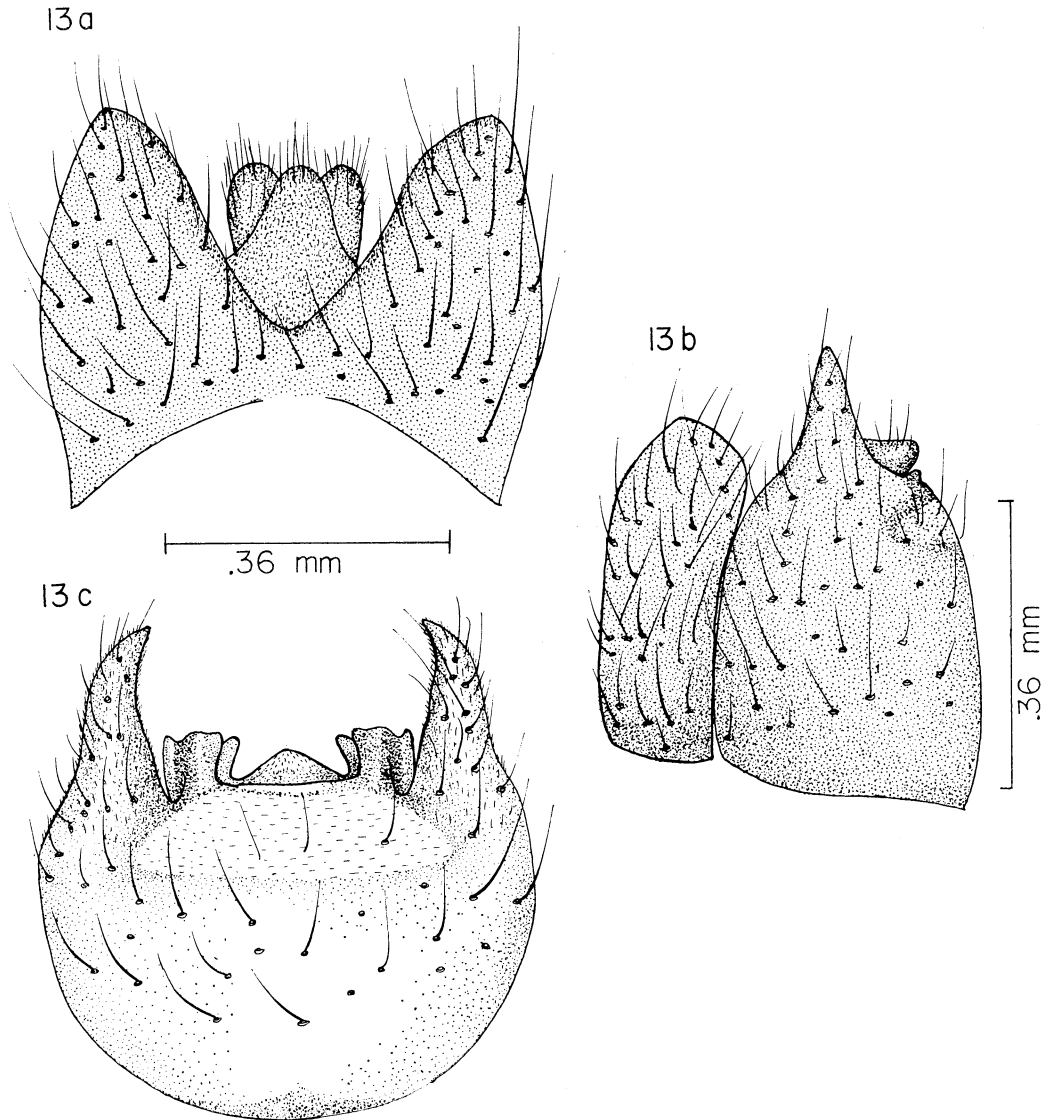


Fig. 13. *Plecia acuminata* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

malaise trap, J. & M. Sedlacek. Two ♂ paratypes, same locality as type, 29.VII.1961-12. IV.1965, 1200-1250 m, same collectors. Type and 1 paratype in the B. P. Bishop Museum. One paratype in the University of Hawaii collection.

***Plecia amplipennis* Skuse** Fig. 15a-b.

Plecia amplipennis Skuse, 1888, Proc. Linn. Soc. N. S. W., series II, 3: 1372.—Hardy, 1958, Pacif. Sci. 12(3): 190, fig. 1a-c.

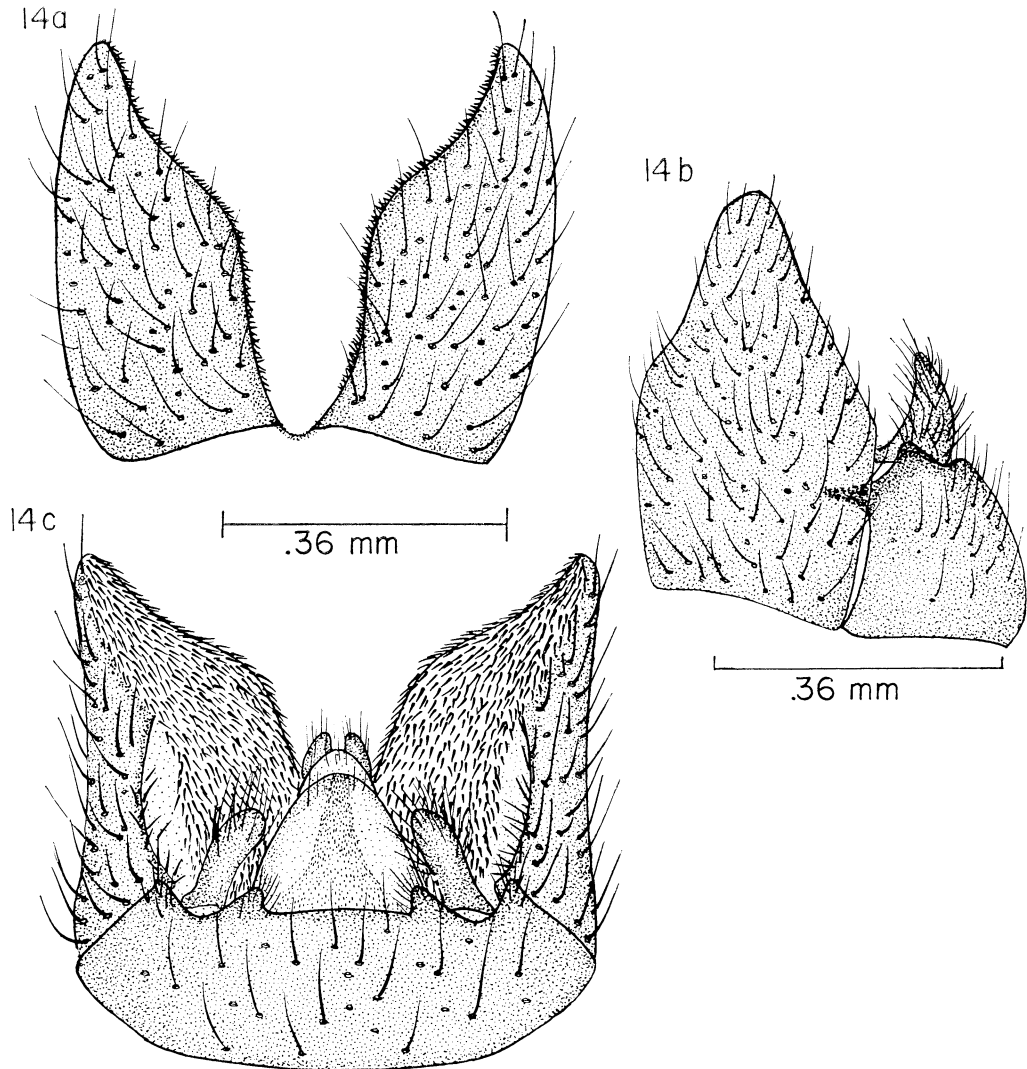


Fig. 14. *Plecia affinidecora* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

This is 1 of the many species which has the thorax entirely orange, and which is characterized by the distinctive ♂ genitalia. The 9th sternum is very short compared to its width and is 3-4× wider than long. Claspers large and conspicuous, flattened dorsoventrally and joined medianly by a narrow bridge. Parameres well developed and often protrude along sides of aedeagus. The 9th tergum short and broad, divided into 2 almost complete plates, these are connected by a narrow median bridge. Posterolateral margins broadly rounded and inner surface very densely covered with short black hairs (fig. 15a-b).

Larvae and pupae have prominent spine-like processes on margins of terga. Sterna have only a pair of small submedian processes on each hind margin.

Length: Body, 6.0-8.5 mm; wings, 7.0-9.5 mm.

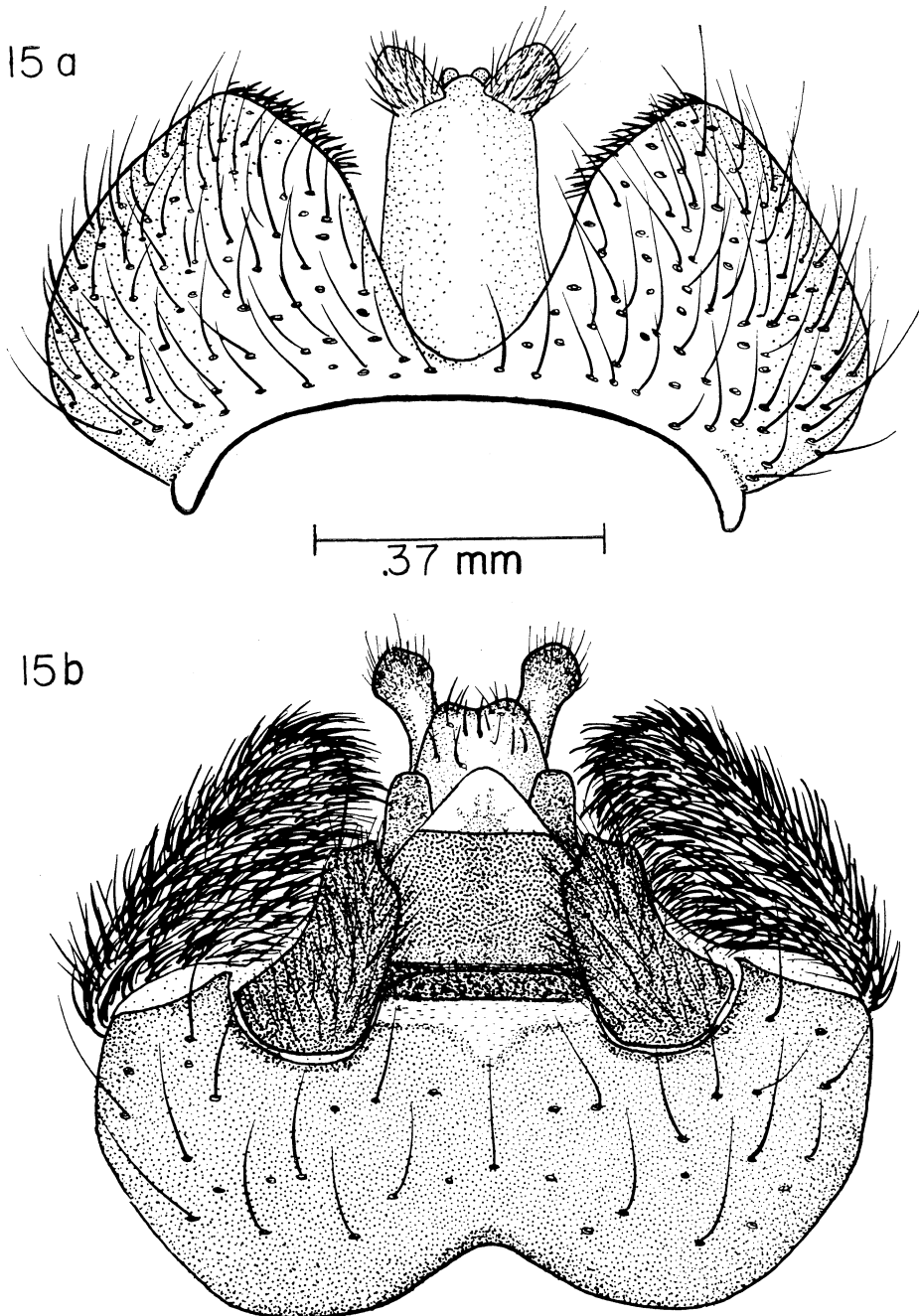


Fig. 15. *Plecia amplipennis* Skuse, ♂ genitalia: a, dorsal; b, ventral.

Type locality Cairns, Queensland. Type in the Australian National Museum.

This is a very widespread species, common throughout northern Australia, Indonesia, the Bismarck Is., Solomon Is., and Western New Guinea (West Irian). Specimens are in the present collections from NW New Guinea: Genjam, 40 km W of Hollandia, 100-200 m, 1-10.III.1960, T. C. Maa; Kota Nica Res., Hollandia, 11.VII.1957, R. T. Simon Thomas. NE New Guinea: Etappenberg, 850 m, X.1912, Bürgers; Simpsonhafen, V.1909, Schoede. New Britain (Lindenhafen, 3.2 km south coast, 25.IV.1956), J. L. Gressitt and Linga Linga Pl'n, W of Willaumez Pen., 9.IV.1956 "poinsettia", Gressitt.

Plecia aruensis Edwards Fig. 16a-b.

Plecia aruensis Edwards, 1925, *Treubia* 6(2): 159.—Hardy, 1958, *Pacif. Sci.* 12(3): 191, fig. 2a-c.

This species has the thorax entirely orange and is characterized by the distinctive development of the ♂ genitalia. The 9th sternum has a pair of prominent submedian lobes which hide the small inconspicuous claspers (fig. 16b) and posterolateral lobes are lacking on the 9th sternum. This species is readily recognized by the characters of the genitalia as shown in fig. 16a-b, and has been adequately treated in my 1958 paper, and also in a paper by Hardy & Delfinado (in press) on the Bibionidae of the Philippines.

Length: Body, 5.0-7.0 mm for ♂, 7.0-9.5 mm for ♀; wings of ♂, 6.0-8.0 mm; wings of ♀, 10.0-12.0 mm.

Type locality Aru I. (Aroe). Type in the British Museum (Nat. Hist.).

The species is known from the Bismarck Is., New Guinea, Indonesia (Aroe and Baru Is.) and from the Philippines.

SPECIMENS EXAMINED: SE NEW GUINEA: Normanby I., Wakaiuna, Sewa Bay, 11.IV-9.XI.1956, L. J. Brass & W. W. Brandt; Kiunga, Fly River, 15-21.VII.1957, Brandt; Kokoda Pitoki, 400 m, 23.III.1956, J. L. Gressitt; Daradae Pl't'n, 500 m, 80 km N of Port Moresby, 6.IX.1959, T. C. Maa; Koitaki, 460 m, X-XI.1928, C. Pemberton; Waikaiuna, Normanby I., 0-50 m, No. 1, 5th Archbold Exped. to New Guinea, L. J. Brass. NE NEW GUINEA: Tsenga, 1200 m, Upper Jimmi Val., 14.VII.1955, Gressitt; Korop, Upper Jimmi Val., 1300 m, 12.VII.1955, Gressitt; Lae, sea level, 20.IX.1935, Gressitt; Kainantu, 1650 m, 20-26.X.1959, light trap, Maa; Eliptamin Val., 1200-1350 m, 16-30.VIII.1959, Brandt; Torricelli Mts, Nengian Vill., 19-24.XI.1958, Brandt; Finisterre Range, Saidor, Kiambavi Vill., 22-29.VII.1958, Brandt; No. 11, Arau, Kratke Mts, valley of upper Wanton Riv., 1400 m, 7-23.X.1959, 6th Archbold Exped. to Papua New Guinea, Eastern Highlands District, L. J. Brass; No. 10, Purosa Camp, Okapa area, 1950 m, 27.IX.1959, 6th Archbold Exped., Papua New Guinea, E. Highlands Dist., Brass; Gang Creek Camp, Mt Rawlinson, 1370 m, 8.VI.1964, 7th Archbold Exped., New Guinea, Huon Pen., Morobe Dist., H. M. van Deusen; Mt Dayman, Maneau Range, 700 m, N slope No. 6, 13-20.VII.1953, Papua, New Guinea, Geoffrey M. Tate. NW NEW GUINEA: Wisselmeren (numerous records in this vicinity), 1500-1800 m, 7-17.VIII.1955, Gressitt.

Plecia bifida Hardy, new species Fig. 17a-c.

A member of the *decora* complex which has the mesonotum rufous and the pleura dark brown and because of having the 9th tergum divided into 2 blunt lobes on each side it would fit near *obtusilobata* n. sp. *P. bifida* is differentiated by having the claspers shorter

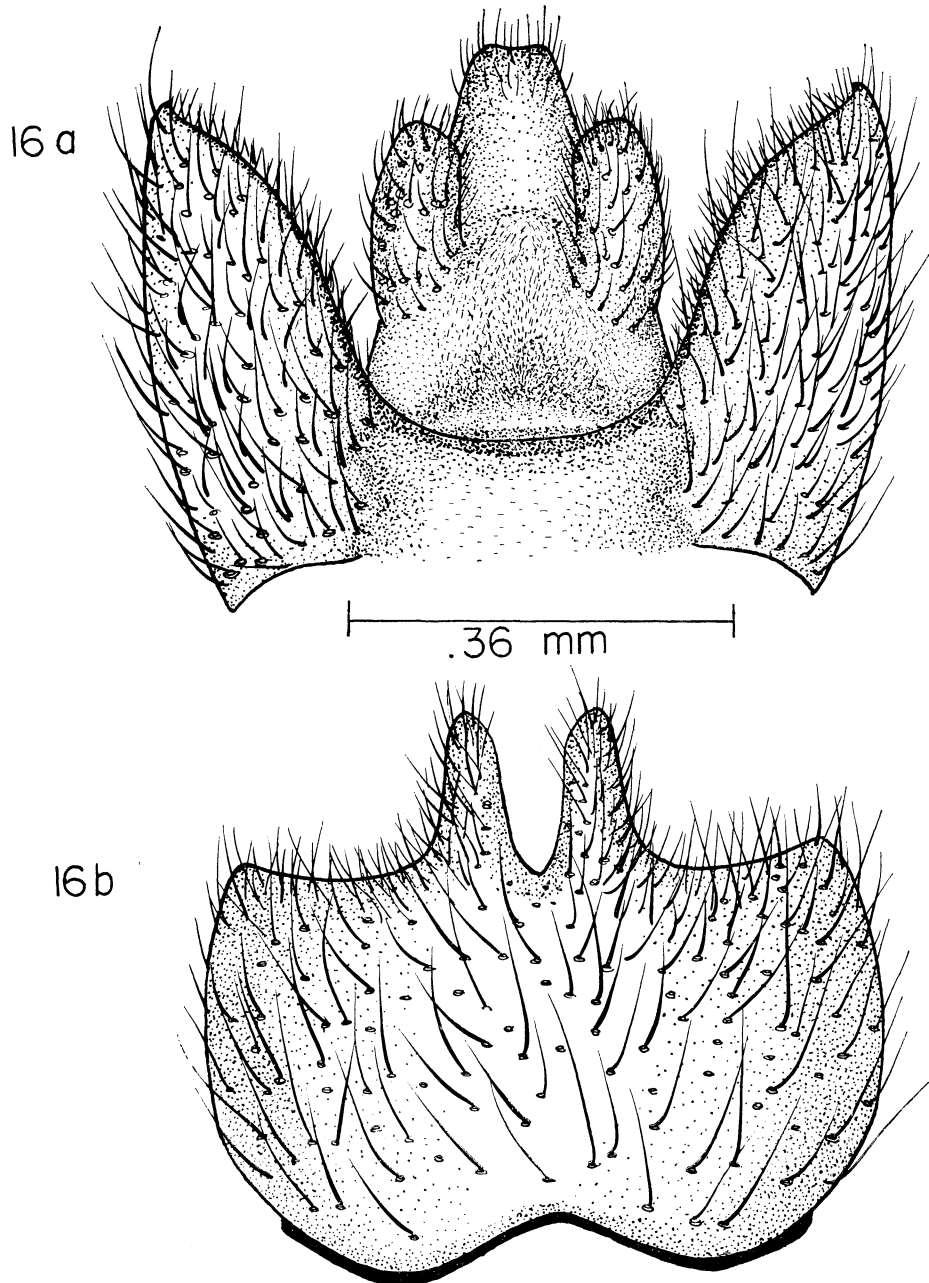


Fig. 16. *Plecia aruensis* Edwards, ♂ genitalia: a, dorsal; b, ventral.

than the sternum (fig. 17c), curved inwardly at their apices and each bearing a large sub-basal lobe, as seen in lateral view (fig. 17b). In *obtusilobata* the claspers are long and

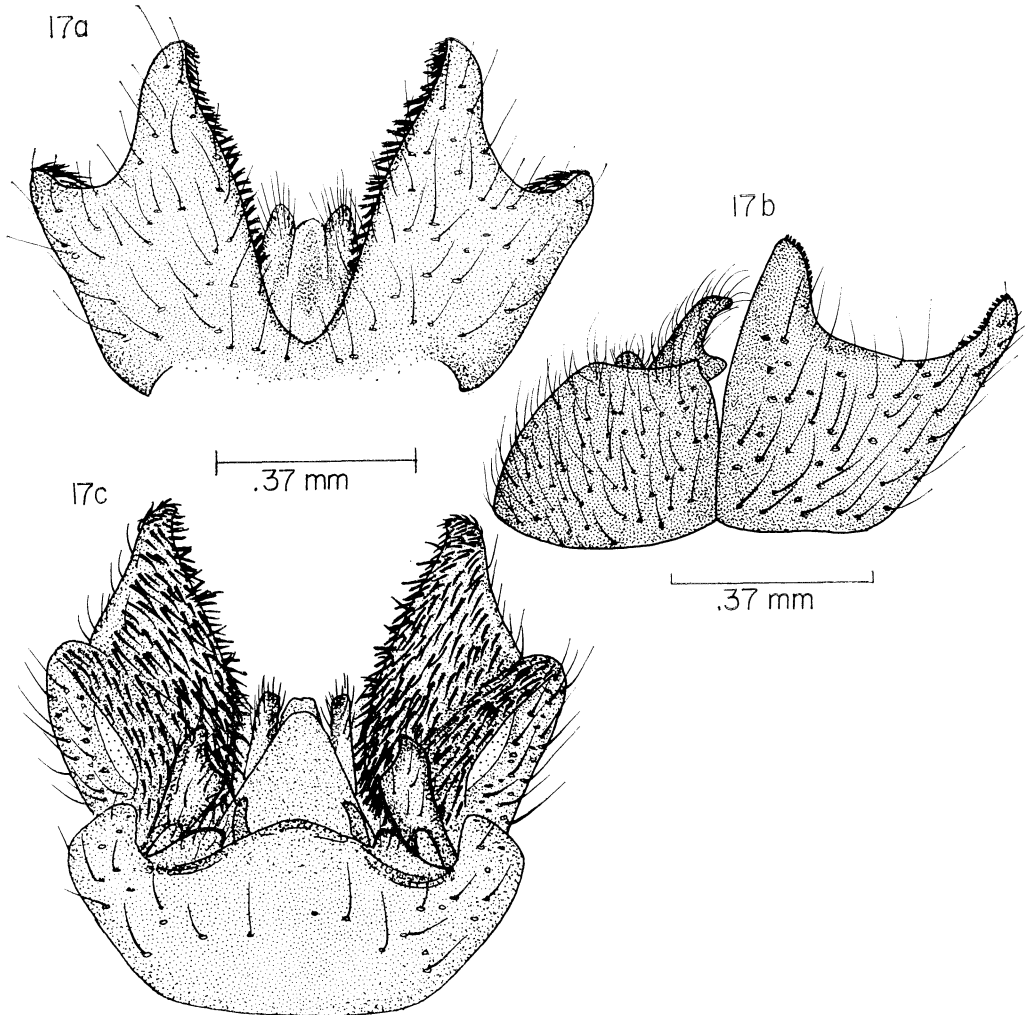


Fig. 17. *Plecia bifida* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

slender, hardly curved inward at the apices and each has a small, rounded dorsobasal lobe (fig. 34c). The posterolateral lobes of the sternum are more prominent in *obtusilobata* (fig. 34b-c). Also the pleura of *bifida* are dark-colored, whereas in *obtusilobata* the thorax is entirely orange except for a tinge of brown along the upper portions of the pleura.

Head: Fitting general characteristics of Pacific *Plecia*. *Thorax*: Rufous over dorsum, dark brown, faintly tinged with red on sides. Scutellum and metanotum brown, tinged with red. *Legs*: Entirely dark brown to black with a faint tinge of yellow in the ground color of bases of femora and on trochanters. *Wings*: Evenly pale brown tinged, stigma and subcostal cell slightly darker than membrane. Vein R_{2+3} straight, oblique, forming a 65° angle with R_{4+5} . Lobes of 9th tergum shaped as in fig. 17a-b. Inner surface of each plate of tergum densely covered

with black scale-like setae which are bifid at their apices. Sternum and claspers shaped as in fig. 17b-c.

Length: Body, 4.75 mm; wings, 5.75 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7751), NE New Guinea; Finisterre Range, Saidor, Kiambavi Vill., 22-29.VII.1958, W. W. Brandt. Type in the B. P. Bishop Museum.

Plecia bisulca Hardy, new species Fig. 18a-c.

An all dark-colored species fitting the *decora* complex because of the ♂ genitalia. Fitting near *duplicis* n. sp. by having the 9th tergum divided into 2 prominent, sharp-pointed lobes on each side (fig. 18a). It is differentiated from *duplicis* by the submedian lobes of the tergum being much smaller than the posterolateral lobes and by each clasper having a subapical dorsal lobe (fig. 18c). In *duplicis* the submedian lobes are equal in size to the

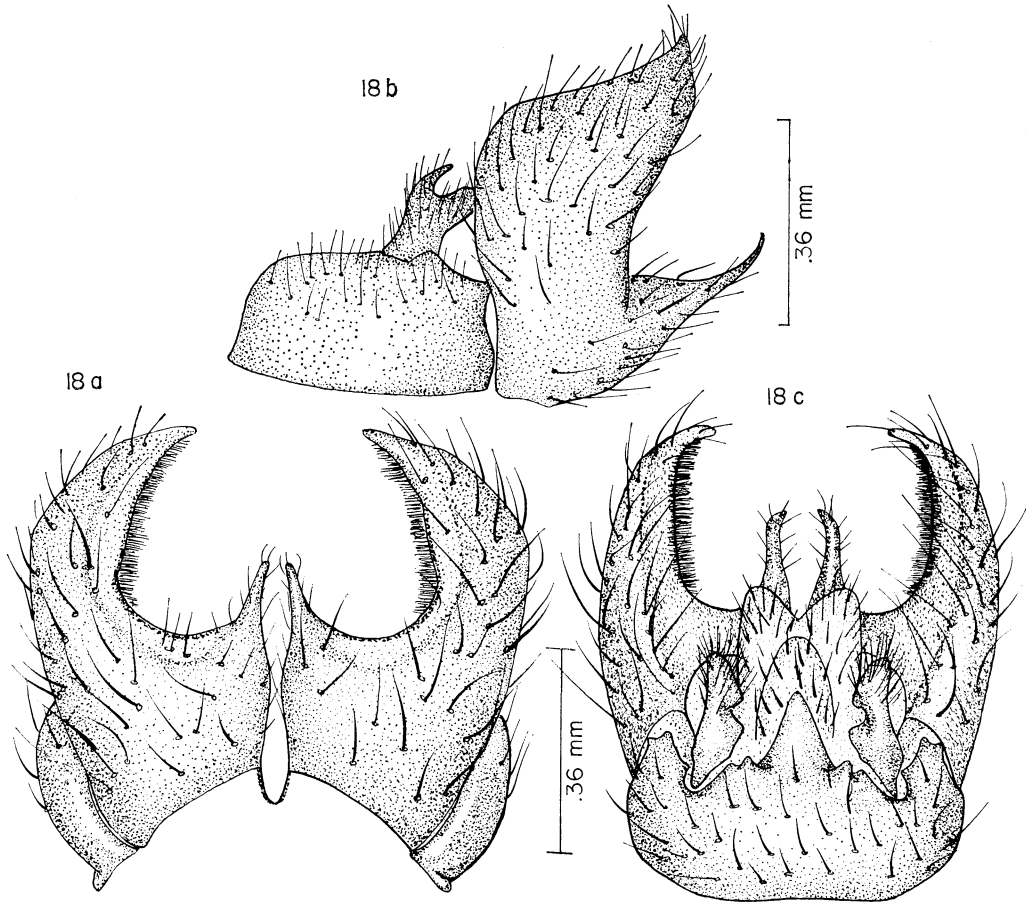


Fig. 18. *Plecia bisulca* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

posterolateral lobes (fig. 25a), and the claspers have dorsobasal lobes (fig. 25b). Also, the thorax of *bisulca* is predominantly or entirely black, where that of *duplicis* is entirely orange.

♂. Fitting general characteristics of *decora* except that the thorax is entirely dark colored except for a tinge of yellow on the humeral ridges; and wings are evenly tinged with brown. Antenna has 6 flagellomeres, the last 2 closely joined. Thorax opaque brownish black with a faint tinge of rufous in ground color on sides of mesonotum and on pleura. Some specimens have a distinct reddish tinge in ground color over entire thorax. Halteres black except for brownish-yellow bases. Legs black, tinged with yellow to rufous at bases of femora. Wings evenly tinged with brown, stigma just slightly darker than membrane. Vein R_{2+3} straight, oblique, entering costa at about a 60° angle to Vein R_{4+5} . 9th tergum of ♂ completely divided into 2 plates, connected by a very narrow median bridge and with well-developed submedian lobes (fig. 18a). Submedian lobes are less than .50 the size of posterolateral lobes of tergum. 9th sternum very short, scarcely .33 the length of tergum. Posterolateral margins and submedian lobes poorly developed on sternum. Claspers slightly capitate, subacutely pointed as seen from direct ventral view and densely haired apically (fig. 18c). As seen from lateral view each clasper has a large subapical dorsal lobe, this is rounded at apex (fig. 18b).

Length: Body, 4.7 mm; wings, 5.4 mm.

♀. Specimens on hand which apparently fit here are entirely black, antennae have 8 flagellomeres and the front with a median carina extending almost entire length. The ♀ specimens have not been directly associated with the ♂♂ and are not being designated as part of the type series since there is possibility of confusion based just on coloration.

Holotype ♂ (AMNH), No. 11, Arau, Kratke Mts, valley of upper Wanton Riv., Eastern Highlands, NE New Guinea, 1400 m, 12.X.1959, 6th Archbold Exped., Papua, New Guinea, L. J. Brass.

Five ♂ paratypes, 2 same data as type and 1 each from the following localities: NE New Guinea: Korop, Upper Jimmi Val., 1300 m, 12.VII.1955, light trap, J. L. Gressitt. SE New Guinea: Highlands: Dimifa, SE of Mt Giluwe, 2200 m, 10.X.1958, light trap, Gressitt; and Papua, Owen Stanley Range, Goilala, Bome, 1950 m, 16-30.IV.1958, W. W. Brandt.

Type and 1 paratype returned to the American Museum of Natural History, other paratypes in the B. P. Bishop Museum and the University of Hawaii collection.

SPECIMENS EXAMINED: 8♀♀. NE NEW GUINEA: 6.4 km W of Wabag, 2020 m, 13.VI.1963, J. Sedlacek; Wau, Morobe Distr., 1200 m, 18.VII.1961, malaise trap, Sedlacek; Mt Otto, 2200 m, 23.VI.1955, J. L. Gressitt. NW NEW GUINEA: Waris, S of Hollandia, 450-500 m, 1-7.VIII.1959, light trap, T. C. Maa.

***Plecia crenula* Hardy, new species** Fig. 19a-c.

This species from the Cape York Peninsula is being included here since it is obviously closely related to *patula* from New Guinea. This belongs in the *ruficornis* complex but has the posterolateral lobes of the sternum very short, not over .25 as long as the remainder of the sternum. It is differentiated from *patula* by having the posterolateral lobes indented at apices (fig. 19a), and the claspers wider than long, rather truncate apically (fig. 19c).

Thorax predominantly rufous, pleura tinged with brown along upper portions and anterior

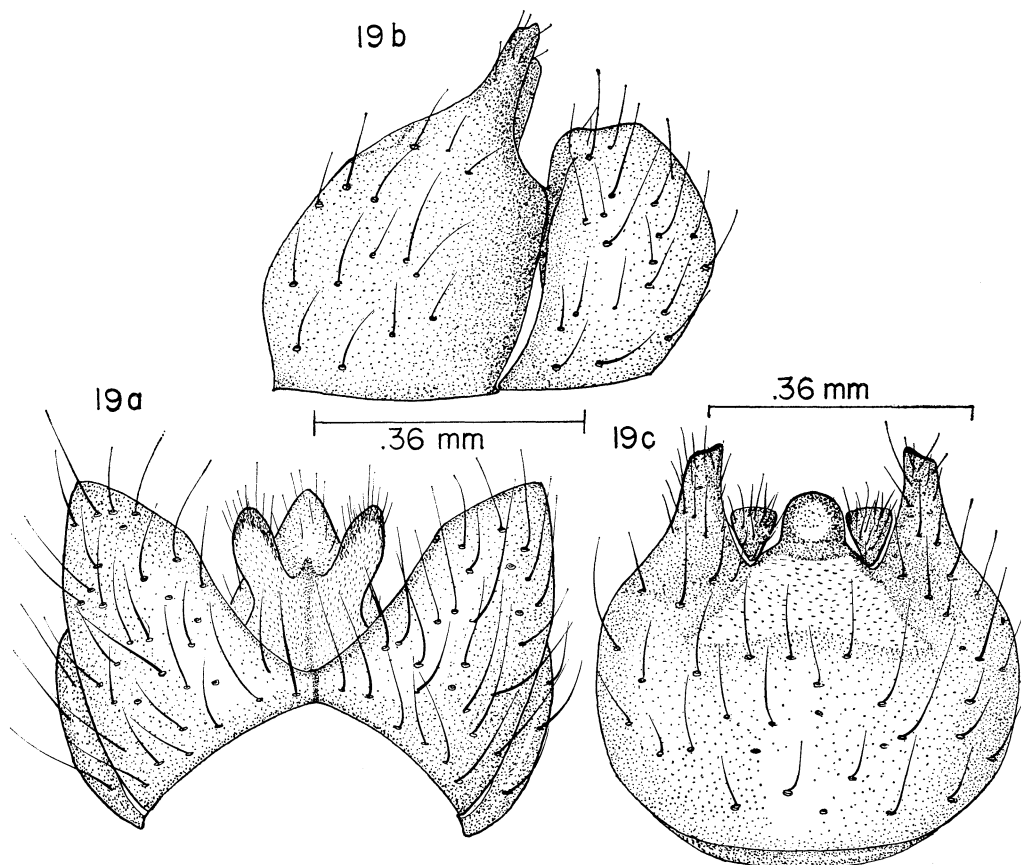


Fig. 19. *Plecia crenula* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

portion of mesonotum faintly tinged with brown. On the type, Vein M_2 evanesces before reaching the wing margin; this is apparently a freak condition, however, because the other specimens do not show this. Cleft on hind margin of 9th tergum extends almost to base of segment, sides gradually sloping. Shape of lobes of tergum as in fig. 19a. 9th sternum as long as wide, not including posterior lobes. Posterolateral lobes approximately .25 as long as remainder of segment and notched at their apices. Claspers wider than long, truncate apically. Submedian lobes on posterior margin of sternum rather small; they rise dorsad of the claspers and are clearly visible only in dorsal view. A prominent heavily sclerotized, black, median projection present on sternum; this is rounded at apex and extends slightly beyond apices of claspers (fig. 19c). Lateral view as in fig. 19b.

Length: Body, 4.0 mm; wings, 4.3 mm.

♀. Unknown.

Holotype ♂ (AMNH), Mt Finnegan, Shiptons Flat, Cape York Pen., 270 m, 16.IX.1948, Archbold Cape York Exped., G. M. Tate. 2♂ paratypes, Mt Finnegan, Cape York Pen., Rossville Creek Camp, 350 m, 12.IX.1948, Tate. Type and 1 paratype returned to the American Museum of Natural History. One paratype in the University of Hawaii collection.

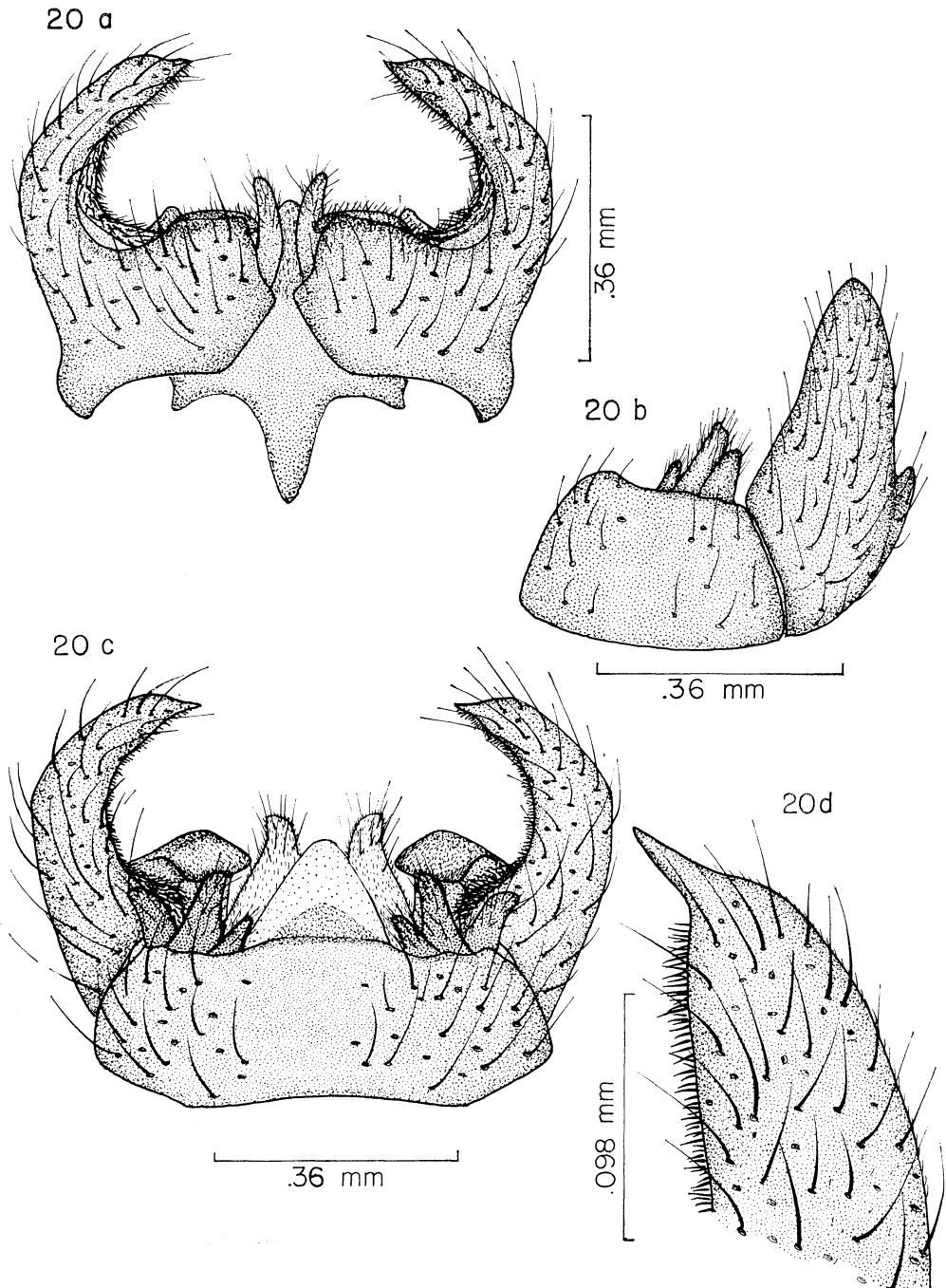


Fig. 20. *Plecia curtispina* n. sp., a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, clasper, lateral.

Plecia curtispina Hardy, new species Fig. 20a-d.

This species belongs in the *decora* complex and resembles *decora* except for the ♂ genitalia. The presence of a spine-like point at the apex of each lobe of the 9th tergum and the presence of prominent posterolateral lobes on the 9th sternum would relate this to *magnispina* Hardy and to *serrifera* n. sp. The lobes of the 9th tergum are distinctly different from those of *magnispina* as shown in fig. 20a and 30a and the species is much more closely related to *serrifera* but differs by having a prominent preapical dorsal lobe on the clasper and by lacking the preapical serrations which are typical of that species (fig. 20d, 40d). Also the posterolateral margins of the sternum are not divergent (compare fig. 20c, 40c).

♂. Fitting the general descriptions of *decora* and *magnispina*, the mesonotum is, however, uniformly brownish red without the pale lines down the dorsocentral areas. *Wings*: Evenly pale brownish gray, slightly darker in costal and subcostal cells and with stigma brown. Vein M_{3+4} curves downward sharply just before apex. Lobes of 9th tergum rather strongly forcpate, almost 2× longer than remainder of segment and distinctly incurved on inner margins. 9th tergum has a dense clump of closely placed black setae on posteromedian margin of each plate and inner surface of each lobe rather thickly covered with flat brown setae (these are not arranged in a dense clump as in *magnispina* and are not forked as in some other members of this complex). A rather prominent short spine present at apex of each lobe of tergum (fig. 20a). Posterolateral lobes of sternum well-developed, these are flattened laterally, directed posteriorly and as seen from lateral view are rounded apically (fig. 20c). As seen from ventral view, the claspers are rather short, scarcely .33 longer than posterolateral lobes of sternum and rather rounded at apices. From lateral view each clasper has a prominent preapical, acutely pointed lobe (fig. 20d).

Length: Body, 4.5 mm; wings, 5.5 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7752), NE New Guinea: Mt Otto, 2200 m, 22.VII.1955, J. L. Gressitt. 2♂ paratypes, 1 NE New Guinea: Mt Wilhelm, 3000 m, 4.VII.1955, Gressitt; and No. 6, Pengagl Camp, E slopes of Mt Wilhelm, 2770 m, 26.VI.1927 (1959, 6th Archbold Exped. to Papua, New Guinea), L. J. Brass. Type in the B. P. Bishop Museum, 1 paratype in the American Museum of Natural History and 1 in the University of Hawaii collection.

Plecia cuspidata Hardy, new species Fig. 21a-d.

Belonging in the *ruficornis* complex because of the development of the posterolateral and submedian lobes of the 9th sternum (fig. 21c), this species is related to *ruficornis*.

♂. *Head*: Basal segments of antennae yellow. Flagellum entirely black and composed of 7 flagellomeres. Last segment of palpus about 4× longer than wide. *Thorax*: Predominantly orange, tinged with brown on upper pleura. Halteres dark brown except for a tinge of yellow on bases. *Wings*: Rather evenly tinged with brown, darker along anterior margin. Stigma concolorous with membrane. *Abdomen*: Dark brown to black covered with black pile. 9th tergum cleft almost to its base, the lateral lobes broadly rounded apically (fig. 21a). Not including posterolateral lobes, 9th sternum is distinctly wider than long. Posterolateral lobes approximately 2/5 as long as remainder of sternum, pointed at apices (fig. 21b, c). As seen from ventral view, claspers longer than wide and sharply pointed on inner apices (fig. 21c). Submedian

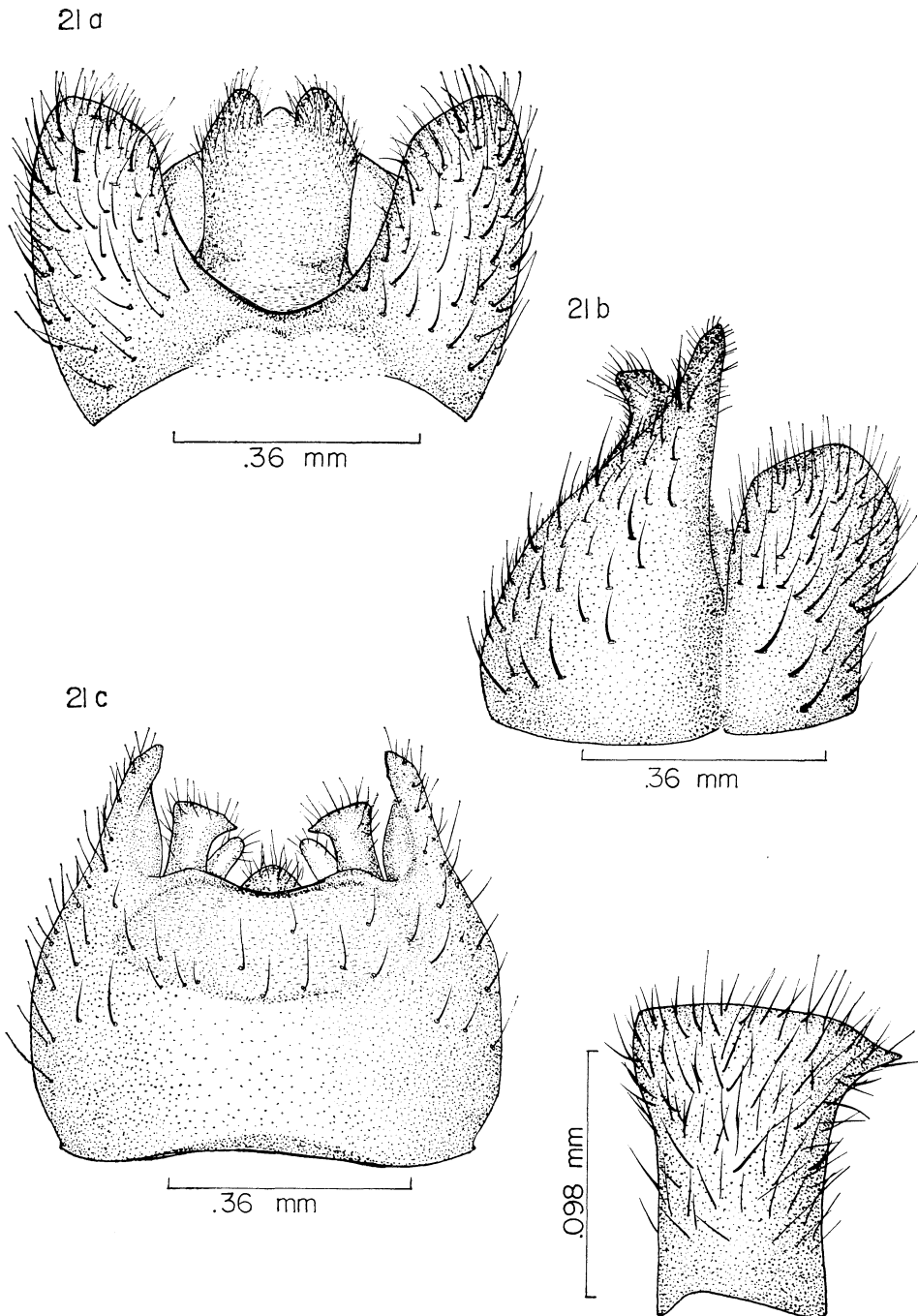


Fig. 21. *Plecia cuspidata* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral; d, clasper, lateral.

lobes on hind margin of sternum distinctly visible from ventral view and a small median gibbosity is present on hind margin. Claspers shaped as in fig. 21c, d.

Length: Body, 5.0 mm; wings, 6.0 mm.

♀. Unknown.

Holotype ♂ labelled "D. N. Guinea Kais. Augustaf. exp. Bürgers. S. G.". This was collected in Sepik, NE New Guinea. The type has been returned to the Zoologisches Museum der Humboldt Universität zu Berlin.

***Plecia decora* Hardy** Fig. 22a-e.

Plecia decora Hardy, 1950, Proc. Haw. Ent. Soc. **14**: 78, fig. 3a-c; 1958, Pacif. Sci. **12**(3): 194, fig. 5.

Because of the development of the lobes of the 9th tergum (fig. 22a) this species would fit near *magnispina* Hardy and *serrifera* n. sp. and is differentiated by lacking a spine-like process at the apex of each lobe of the tergum. Also by having a large dorsobasal lobe on each clasper which is almost equal in size to the apical lobe (fig. 22d), and by having the posterolateral margins of the sternum only slightly developed (fig. 22c). The arrangement of the densely marged, thick, black hairs on the inner surface of the tergum is also distinctive.

Ocellar triangle in ♂ very prominent and stands well above compound eyes. 1st segment of antenna brown, 2nd yellow-red. Flagellum brown to black and with 7 flagellomeres, the last 2 closely joined. Palpi slender, last 3 segments approximately equal in length, 4-5× longer than wide. Thorax typically rufous, tinged with brown on pleura and with 3 reddish-brown vittae extending down mesonotum. Coloration of thorax somewhat variable; some specimens with pleura dark brown and others with mesonotal vittae dark brown to black. Wings faintly tinged with brown, stigma distinctly darker than membrane. Vein R_{2+3} oblique and enters costa at about a 50° angle to R_{4+5} . As seen from dorsal view 9th tergum shaped as in fig. 22a; lobes rather thickened medianly and are forcipate, equal to or slightly longer than basal portion of tergum. Inner surfaces of lobes of tergum covered with short black setae but no scale-like setae. A dense patch of short, thick, very densely placed black hairs present on inner surface of tergum on each side of median cleft (fig. 22c). Claspers shorter than 9th sternum, curved inwardly at their apices and each with a prominent dorsobasal lobe as seen in lateral view (fig. 22c-d). 8th tergum has a U-shaped concavity on posterior margin extending .66 the length of segment and terga 6 and 7 have slight concavities on posterior margins.

The ♀♀ are typically darker colored than the ♂♂, with thorax predominantly dark brown with but a faint tinge of red. Eight flagellomeres present in the ♀ antennae. Egg guides shaped as in fig. 22e.

Length: Body, 5.0-6.3 mm; wings, 6.0-10.0 mm.

Type locality Mt Tafa, Papua. Type in the British Museum (Nat. Hist.).

SPECIMENS EXAMINED: Ca 60 spec. (B. P. Bishop Museum, American Museum and the Rijksmuseum v. Natuurlijke Historie, Leiden). NE NEW GUINEA; Daulo Pass, 2400 m, Asaro-Chimbu Div.), 15.VI.1955, J. L. Gressitt; Mt Otto, 2500 m, 21.VII.1955, Gressitt; Mt Kaindi, 2400 m, 27.I.1963, in light trap, J. Sedlacek; 6.4 km W of Wabag, 2020 m, 13.VI.1963, Sedlacek; Wau, Morobe Distr., 1200 m, 20-25.III.1962, Sedlacek; Miramar-Gobayabe, Asaro V., 2000 m, 29.VI.1955, Gressitt; Nenguag, Asaro-Chimbu Div., 2500 m, 29.VI.1955, Gressitt; E. Highlands, No. 7, Kotuni, S slopes of Mt Otto, 2200 m, 4-20.VIII.1959, 6th Archbold Exped., L. J. Brass; E. Highlands, No. 10, Purosa Camp, Okapa area, 1950 m, 23.IX.1959, 6th Archbold Exped., Brass; E. Highlands, No. 6, Pengagl Camp, E slopes

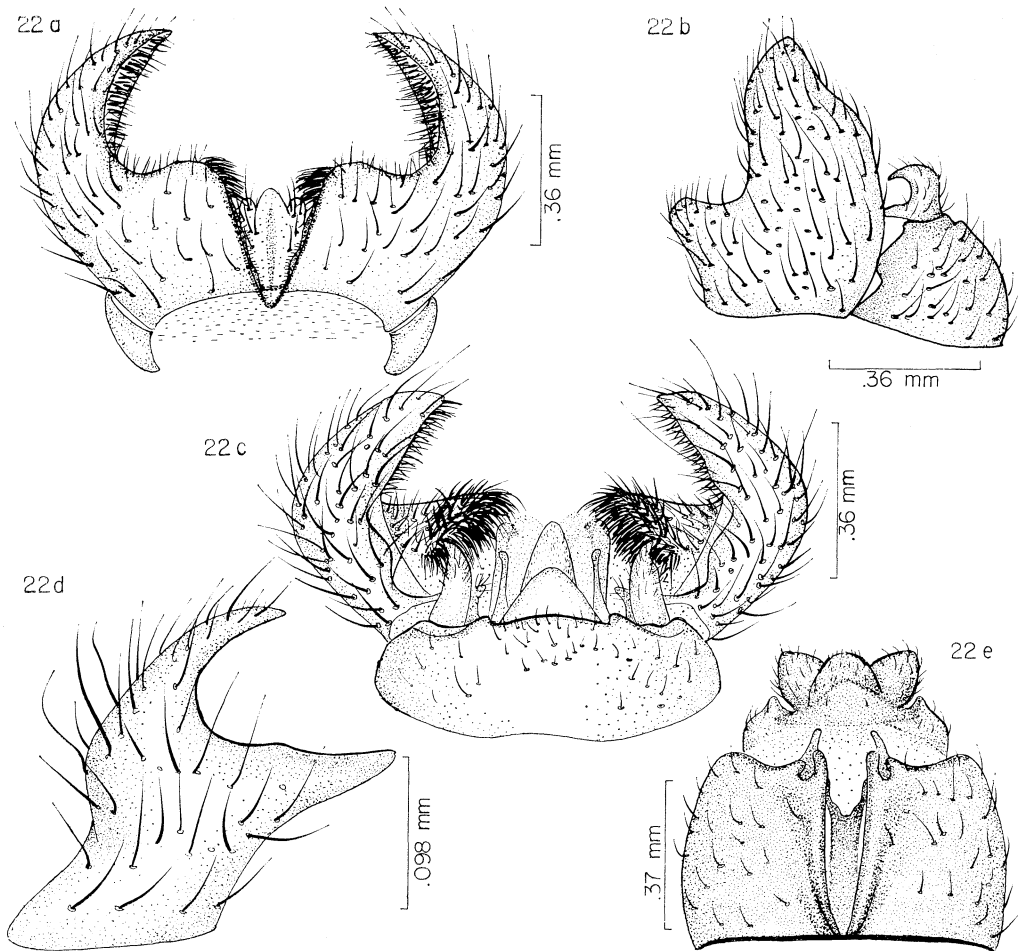


Fig. 22. *Plecia decora* Hardy, a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, clasper, lateral; e, terminalia of ♀, ventral.

of Mt Wilhelm, 2770 m, 10-21.VII.1959, Brass. SE NEW GUINEA: Papua, S. Highlands, ridge W of Dimifa, S of Mt Giluwe, 2350 m, 11.X.1958, Gressitt; Papua, Owen Stanley Range, Goilala, Bome, 1950 m, 24.II-7.III.1958, W. W. Brandt; Papua, Mt Dayman, Maneau Range, 2230 m, N slope No. 4, 15.V-15.VI.1953, G. M. Tate. NW NEW GUINEA: Neth. Ind.-Amer. New Guinea Exped., 2800 m, Moss Forest Camp, 13-31.X.1938, L. J. Toxopeus; Neth. Ind.-Amer. New Guinea Exped., Scree Val. Camp, 3800 m, 27.X.1938, Toxopeus; and Araboebivak, Wisselmeren, Paniai, 1750 m, IX-XI.1939, H. Boschma.

***Plecia disjuncta* Hardy** Fig. 23a-d.

Plecia disjuncta Hardy, 1958, *Pacif. Sci.* **21** (3): 195, fig. 7a-c.

This species is readily differentiated by the broad posterolateral lobes of the 9th sternum,

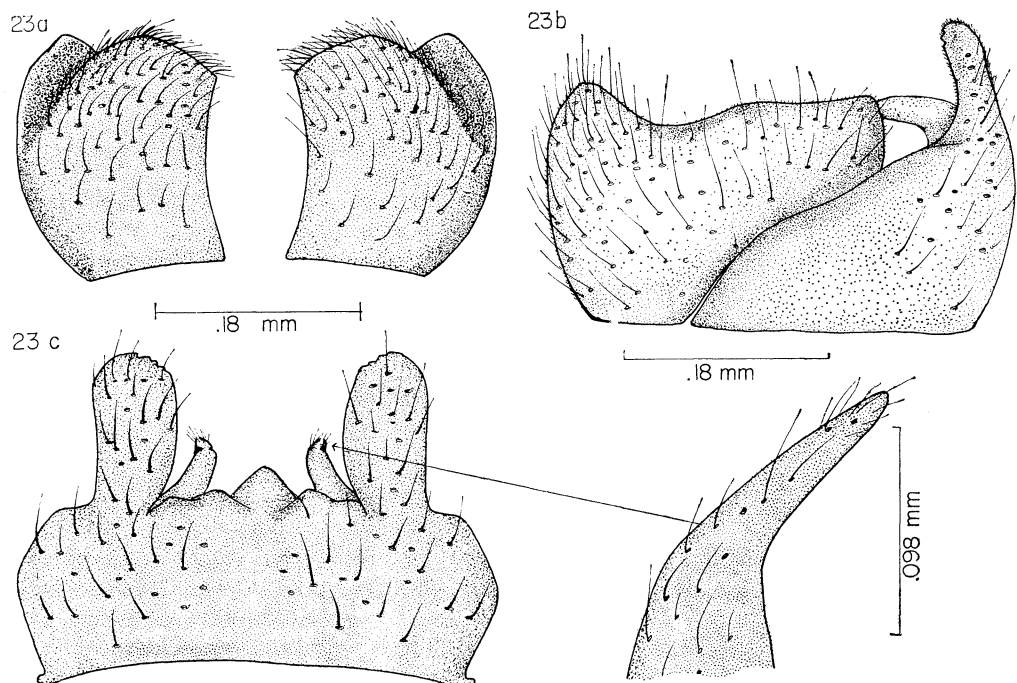


Fig. 23. *Plecia disjuncta* Hardy, a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, clasper, lateral.

each is at least $2\times$ broader than the claspers and is serrated on its inner apex (fig. 23b). The other aspects of the genitalia are as in fig. 23a-d.

Length: Body, 3.0 mm; wings, 3.8 mm.

Type locality Wisselmeren, NW New Guinea. Type in the B. P. Bishop Museum.

Two additional specimens are in the B. P. Bishop Museum collection. These should have been part of the type series. One contains the same data as the type (Okaitadi, 1800 m), the other the same data as 1 of the paratypes (Itouda, Kamo Val.).

***Plecia diversa* Hardy, new status** Fig. 24a-c.

Plecia fumidula diversa Hardy, 1958, *Pacif. Sci.* **12**(3): 202, fig. 14a-b.

This species is obviously closely related to *malayaensis* Hardy and *inconspicua* Hardy, and differs mainly by having the thorax entirely orange rather than having the pleura dark brown to black. The genitalia are similar and *diversa* may be a subspecies of 1 or the other; considerable variation has been noted in the development of the genitalia of the ♂. Specimens from the Philippines typically have the posterolateral lobes of the sternum comparatively elongate, approximately equal in length to the remainder of the segment, while typical *diversa* from the Bismarck Is. and New Guinea have the posterolateral lobes distinctly shorter, usually about .66 as long as the remainder of the sternum (fig. 24c). A series of specimens on hand show some intergradation between these 2 and I am considering it 1 species at the present time.

The other details of the genitalia are shown as in fig. 24a-c.

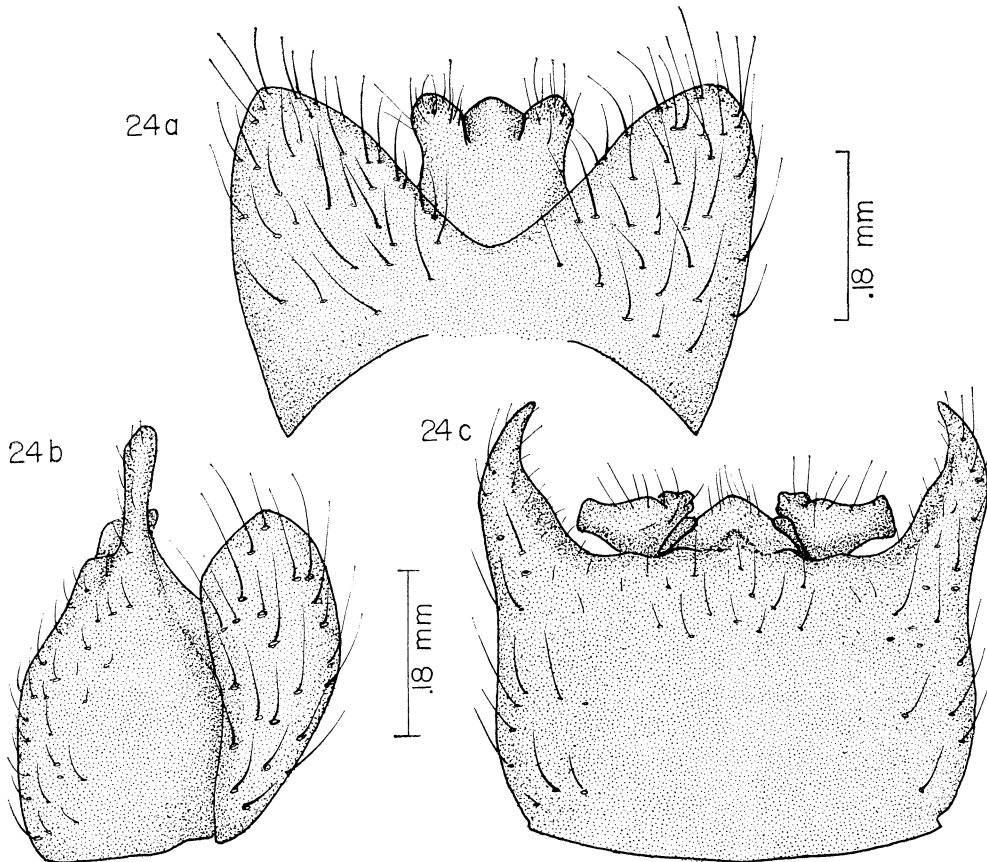


Fig. 24. *Plecia diversa* Hardy, ♂ genitalia: a, dorsal; b, lateral; c, ventral.

Length: Body, 4.5 mm; wings, 5.5 mm.

Type locality Kerawat, New Britain. Type in the B. P. Bishop Museum.

The species is now known from the Bismarck Is., the Philippines and New Guinea. Nine specimens are on hand in the B. P. Bishop Museum from the following localities in New Guinea. NE NEW GUINEA: Minj, W. Highlands, 8-13.IX.1959, T. C. Maa; Moife, 2100 m, 15 km W of Okapa, 7-14.X.1959, Maa; Wau, Morobe Distr., 1200 m, 14.VI.1961, malaise trap, J. L. Gressitt; Goroka, 1550 m, 19.VI.1955, Gressitt; Karimui, S of Goroka, 1000 m, 3.VI.1961, light trap, J. L. & M. Gressitt. NW NEW GUINEA: Waris, S of Hollandia, 450-500 m, 8-15.VIII.1959, light trap, Maa; Wisselmeren, Moanemani, Kamo Val., 1500 m, 15.VIII.1962, J. Sedlacek; and Wisselmeren, Itouda, Kamo Val., 1500-1700 m, 18.VIII.1962, Sedlacek.

***Plecia duplicis* Hardy, new species** Fig. 25a-c.

Because of the development of the genitalia this would fit in the *decora* complex and

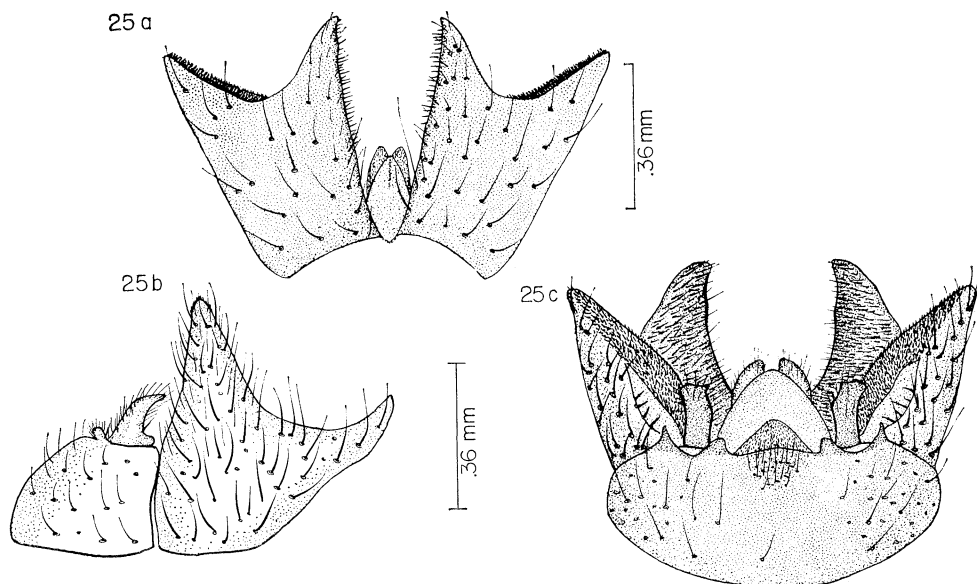


Fig. 25. *Plecia duplicis* n. sp.: a, 9th tergum of ♂, dorsal; b, ♂ genitalia, lateral; c, ♂ genitalia, ventral.

would run in the key near *bisulca* because of the development of a pair of strong sharply pointed submedian lobes on the 9th tergum. It differs strikingly from *bisulca* by having the thorax entirely orange, rather than predominantly black, by having the submedian lobes of the tergum large, about equal in size to the posterolateral lobes (fig. 25a), and by having dorsobasal lobes on the claspers (fig. 25b), rather than subapical dorsal lobes as in *bisulca* (fig. 18b).

♂. Antenna with 7 flagellomeres, the last 2 closely joined. Thorax entirely bright orange except for a tinge of brown along upper portion of each pleuron. Legs predominantly black, basal portions of femora yellow, tinged lightly with brown. Wings evenly pale brown, stigma just slightly darker than membrane. Vein R_{2+3} oblique as in *decora* and other species of this complex. Genitalia shaped as in fig. 25a-c. Inner surfaces of lobes of 9th tergum densely covered with flat scale-like setae. Posterolateral lobes of sternum much more distinctly developed than in *bisulca*, claspers differently shaped than in that species, and the dorsal lobe arises from the base of the segment (fig. 25b).

Length: Body, 4.25 mm; wings, 5.1 mm.

♀. Unknown.

Holotype ♂ (AMNH), NE New Guinea: No. 11, Arau, Kratke Mts, valley of upper Wanton Riv., E. Highlands, 1400 m, 10-20.X.1959, 6th Archbold Exped., Papua, New Guinea, L. J. Brass. Type in the American Museum (Nat. Hist.).

***Plecia fumidula* Edwards** Fig. 26a-c.

Plecia fumidula Edwards, 1933, J. Fed. Malay States Mus. 17: 244.—Hardy, 1958, Pacif. Sci. 12 (3): 202.

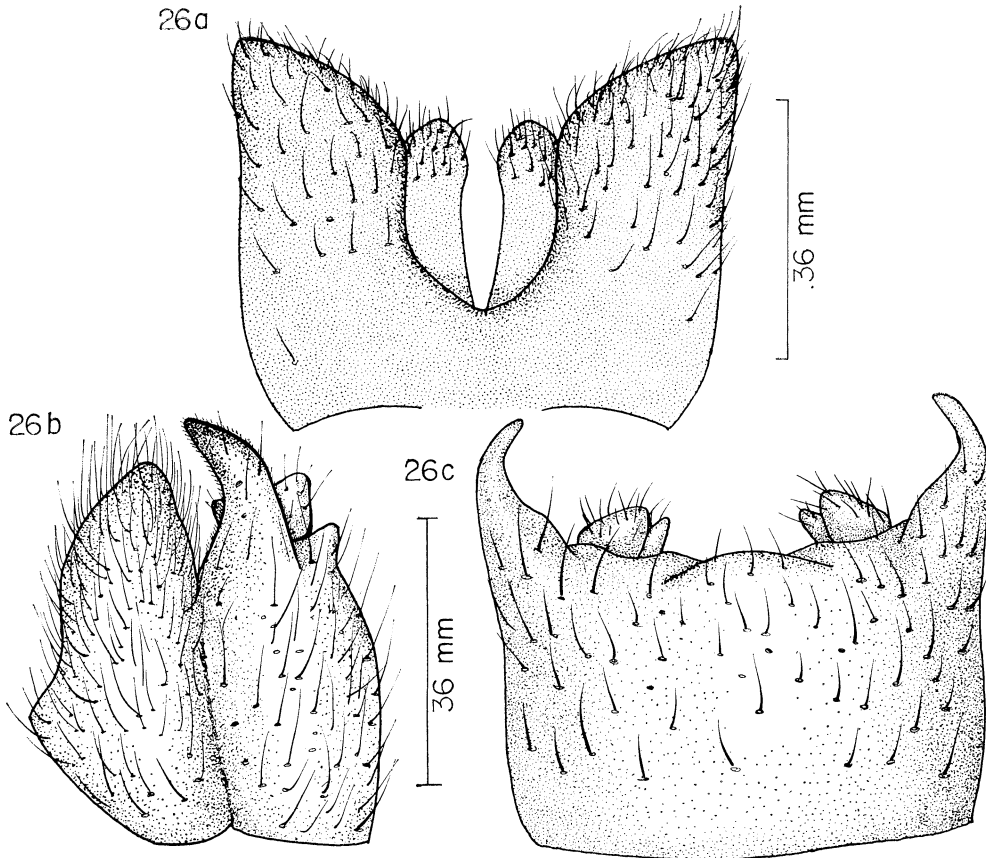


Fig. 26. *Plecia fumidula* Edwards, ♂ genitalia: a, dorsal; b, lateral; c, ventral.

An entirely black species which because of the development of the ♂ genitalia would fit in the *ruficornis* complex. It is obviously closely related to *diversa* Hardy, which had previously been considered as a subspecies of *fumidula*. On the basis of the striking differences in body coloration, I now believe these are distinct species. The genitalia also appear different in the 2, the posterolateral lobes of the 9th sternum are broader, rounded at apices in *fumidula*, this is best seen in direct lateral view (compare fig. 26b, 24b). Also, the shape of the cleft on the hind margin of the 9th tergum differs in the specimens at hand. 9th tergum of *diversa* is broadly V-shaped, while in *fumidula* the shape of the cleft in the hind margin is U-shaped (fig. 26a).

Type locality Mt Kinabalu, Borneo. Type in the British Museum (Nat. Hist.).

SPECIMEN EXAMINED: 1♂. NE NEW GUINEA: Wau, 1750 m, 14.IX.1965, malaise trap, J. & M. Sedlacek. The specimen is in the B. P. Bishop Museum.

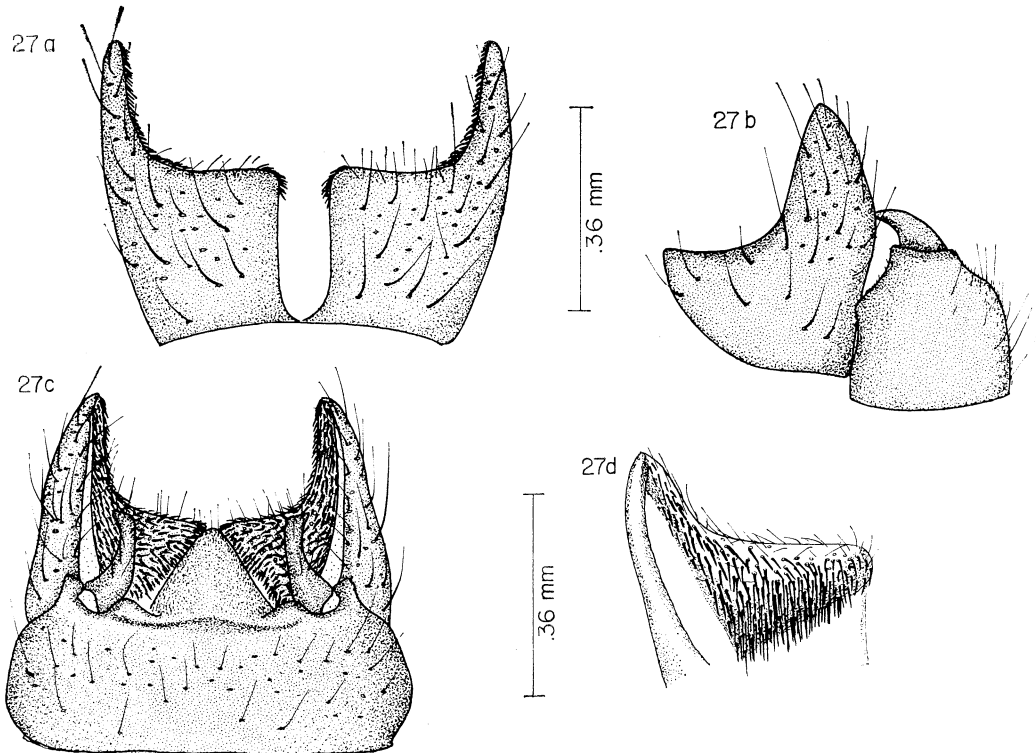


Fig. 27. *Plecia hamata* n. sp., a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, lobe of 9th tergum, ventral.

***Plecia hamata* Hardy, new species** Fig. 27a-d.

A member of the *decora* complex which has the thorax entirely orange, the wings evenly pale brown tinged, and the posterolateral lobes of the 9th tergum gradually tapered to subacute points at apices and with the inner surfaces densely covered with black scale-like setae. It fits near *affinidecora* n. sp. but differs by having the claspers hook-like, strongly bent inward at their apices and lacking secondary lobes (fig. 14c, 27c). Also the lobes of the 9th tergum are differently shaped in the 2 species (fig. 14a, 27a).

Lobes of 9th tergum abruptly tapered, approximately equal in length to the remainder of the tergum and subacutely pointed at apices as seen from dorsal or from lateral views (fig. 27a, b). Dorsal surface of tergum densely black-scaled (fig. 27d). 9th sternum about .50 as long as tergum and $3\times$ longer than wide, posterolateral and submedian lobes rounded, short. Claspers comparatively short, less than length of sternum (fig. 27c). As seen from lateral view, they are bent inward, hook-like at their apices and lack dorsal lobes (fig. 27b).

Length: Body, 3.8 mm; wings, 4.75 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7753), NE New Guinea, Adelbert Mts, Wanuma, 800-1000 m, 27. X.1958, light trap, J. L. Gressitt. Type in the B. P. Bishop Museum.

Plecia inconspicua Hardy Fig. 28a-c.

Plecia inconspicua Hardy, 1950, Proc. Haw. Ent. Soc. **14**(1): 79, fig. 5a-b; 1958, Pacif. Sci. **12**(3): 204, fig. 15a-c.

This species is very closely related to *malayaensis* Hardy but is differentiated by having the posterolateral margins of the 9th tergum subacutely pointed as seen in ventral and lateral views (fig. 28b-c), and having the cleft on the hind margin of the tergum extending almost to the base of the segment and broadly V-shaped. In *malayaensis* the posterolateral margins of the tergum are broadly rounded and the cleft on the hind margin is comparatively shallow.

This species has been adequately described in the above references. The ventral aspects of the genitalia are as in fig. 28c.

Length: Average of ♂, body, 3.4 mm; wings, 4.2 mm. Average of ♀, body, 4.0 mm; wings, 5.5 mm.

Type locality Kokoda, Papua, New Guinea. Type in the British Museum (Nat. Hist.).

SPECIMENS EXAMINED: Ca 130 spec. (B. P. Bishop Mus.): NE NEW GUINEA: Wam-

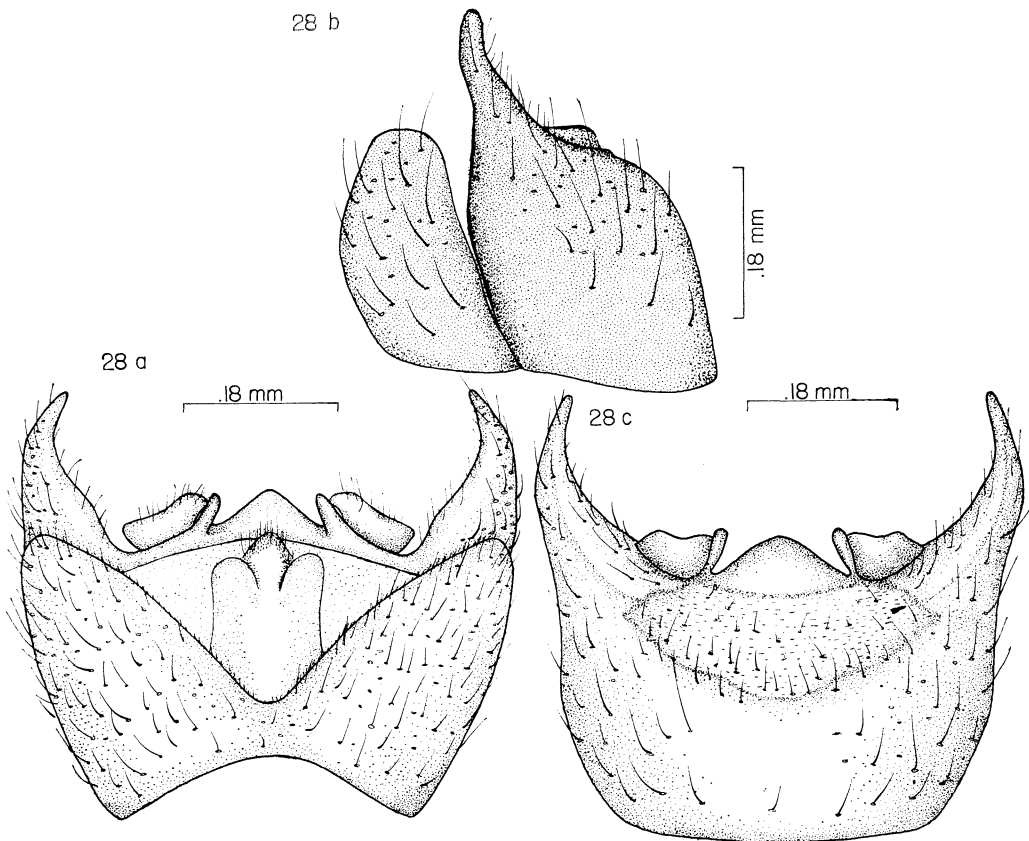


Fig. 28. *Plecia inconspicua* Hardy, ♂ genitalia: a, dorsal; b, lateral; c, ventral.

pit Vill. nr Gurakor Vill., 950 m, nr Wau, 7.VII.1957, D. E. Hardy; Wau, Morobe Distr., 1200-1700 m, 11.VIII.1961-30.VII.1965, malaise trap and light trap, J. & M. Sedlacek; Huon Pen., Pindiu, 860m, 22.IV.1963, J. H. Sedlacek; Dreikikir, Sepik Distr., 350-400m, 22.VI.1961, light trap, J. L. & M. Gressitt; Tapo (=Tapu), 1650 m, 3 km NW of Kainantu, 22.X.1959, T. C. Maa; Adelbert Mts, Wanuma, 800-1000 m, 26.X.1958, light trap J. L. Gressitt; Goroka, 1500-1550 m, 9.VI.1955-22.V.1961, J. L. & M. Gressitt, C. D. Michener; Finisterre Range, Saidor, Matoko Vill., 6-24.IX.1958, W. W. Brandt; W. Distr., Oriomo Govt. Station, 26-28.X.1960, malaise trap, J. L. Gressitt; Sinofi, 1590 m, 30 km S of Kainantu, 1-6.X.1959, Maa; 19 km SE of Okapa, 1800 m, 28.VIII.1964, light trap, J. Sedlacek. NW NEW GUINEA: Waris, S of Hollandia, 450-500 m, 3-31.VIII.1959, H. V. light trap, Maa; River Tor (mouth), 4 km E of Hol Maffen, 19.VII.1959, Maa; Vogelkop, Kebar Val., W of Manokwari, 550 m, 4-31.I.1962, light trap, S. & L. Quate; Bodem, 100 m, 11 km SE of Oerberfaren, 7-17.VII.1959, Maa. SW NEW GUINEA: Vogelkop, Fak Fak, S coast of Bomberai, 10-100 m, 11.VI.1959, J. L. Gressitt.

Plecia intricata Hardy, new species Fig. 29a-c.

This species belongs in the *fulvicollis* complex because of the development of the ♂ genitalia. The thorax is entirely orange, but the genitalia show that this is closely related

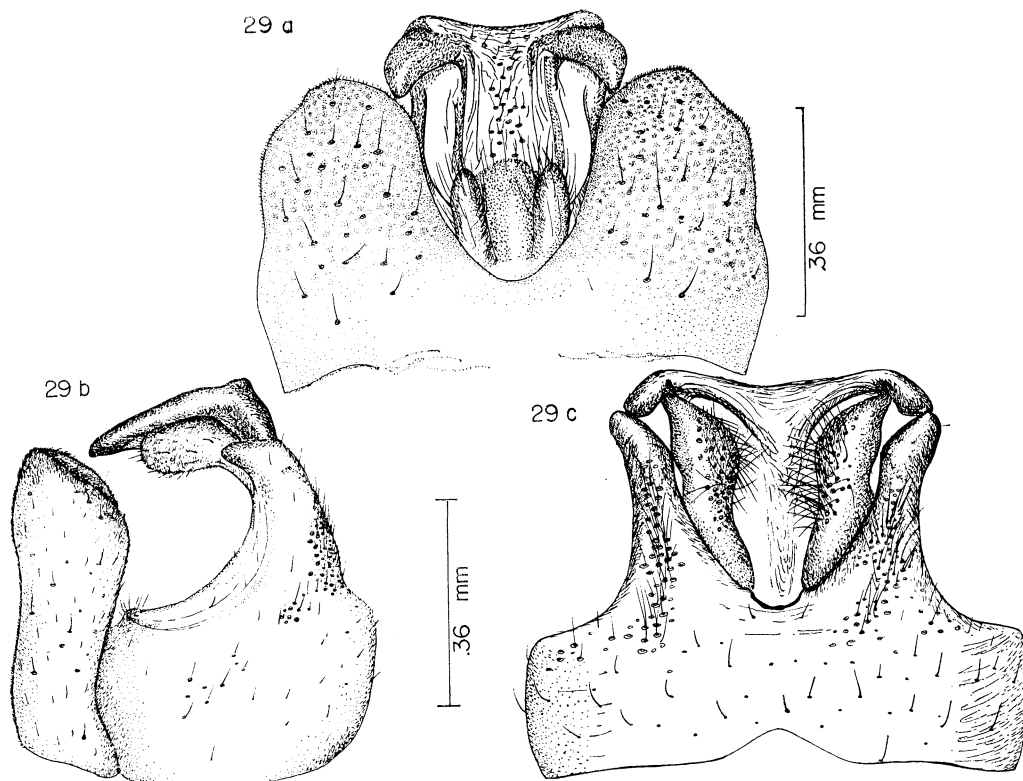


Fig. 29. *Plecia intricata* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

to *multilobata* n. sp. which is entirely black-bodied. It differs from all others which have the thorax rufous by having a strong lobe developed from the dorsal margin of each posterolateral lobe of the 9th sternum as well as by the development of the posterolateral margins of the median projection (fig. 29b-c). The genitalia differ from those of *multilobata* by having the dorsal lobe arising near the distal end of each posterolateral lobe and as seen in lateral view the posterolateral lobe obliquely truncate at the apex (fig. 29b). Also, as seen in ventral view the posterolateral lobes are tapered, sharp-pointed apically and the other genital characters differ as shown in fig. 29a and 29c. Also, refer to diagnosis of *multilobata*.

♂. *Head*: Antenna with 7 flagellomeres, the last 2 closely joined. *Thorax*: Entirely orange, including scutellum except for a very faint longitudinal line of brown across middle. Halteres dark brown, yellowed on their bases. *Legs*: Entirely dark brown to black, tinged faintly with yellow on trochanters. *Wings*: Evenly tinged pale brown, the stigma, costal and subcostal cells brown, darker than membrane. Vein R_{2+3} straight, oblique, entering costa at about a 65° angle to R_{4+5} . Stem of M_{1+2} , from r-m crossvein to fork, scarcely longer than r-m crossvein.

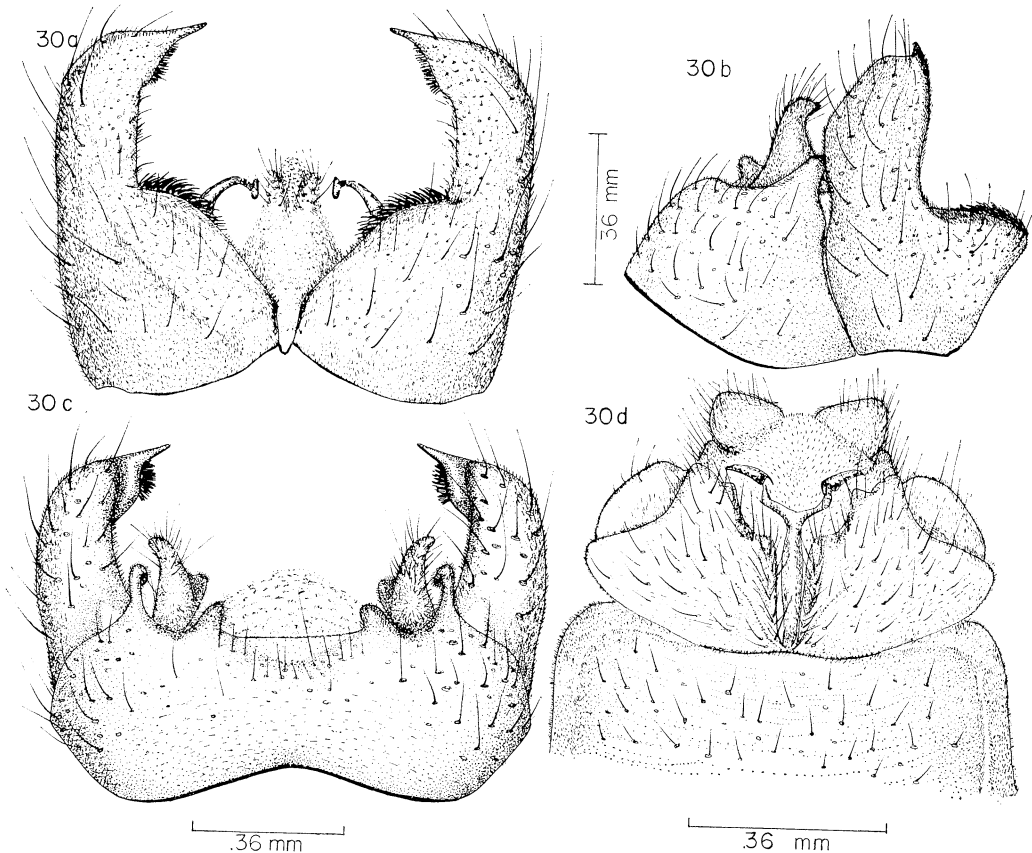


Fig. 30. *Plecia magnispina* Hardy, a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, terminalia of ♀ ventral.

Genitalia as described above and as shown in fig. 29a-c.

Length: Body, 6.0-6.2 mm; wings, 6.9-7.1 mm.

♀. Unknown.

Holotype ♂ (AMNH), Mt Dayman, Papua, New Guinea, Maneau Range, 700 m, N slope, No. 6, 13-20.VII.1953, G. M. Tate. 2♂ paratypes from NE New Guinea: Wau, Morobe Distr., 1200-1300 m, 27-30.VII.1961, in light trap and in malaise trap, J. Sedlacek.

Type returned to the American Museum of Natural History, 1 paratype in the B. P. Bishop Museum and 1 in the University of Hawaii collection.

***Plecia liefтинcki* Hardy**

Plecia liefтинcki Hardy, 1958, *Pacif. Sci.* **12** (3): 205, fig. 16a-c.

This species probably fits in or near the *ruficornis* complex of species but differs from all known species of this group by having the posterolateral margins of the 9th sternum rather poorly developed, extending about .50 as long as the claspers; and by having a rather shallow cleft on the hind margin of the 9th tergum extending barely .50 the length of segment. The original description and figures show no indication of submedian lobes on the hind margin of the 9th sternum; I suspect that these are present, however, and are probably hidden by the claspers, as is typical of this complex of species. It will be necessary to study these genitalia in more detail to be sure of its placement.

The species is not present in the collection at hand and the original description and figures are adequate.

Type locality Biak, Schouten Is. Type in the Rijksmuseum van Natuurlijkje Historie, Leiden.

***Plecia magnispina* Hardy** Fig. 30a-d.

Plecia magnispina Hardy, 1958, *Pacif. Sci.* **12** (3): 206, fig. 17a-b.

This species is related to *serrifera* n. sp. but is differentiated by having the lobes of the 9th tergum comparatively short, not longer than the remainder of the tergum and with a dense clump of black scale-like setae on the inner margin of each lobe just below the apical spine (fig. 30a), also by having the lobes of the posterolateral margins of the sternum slender (fig. 30c) and the claspers not serrate at their apices (fig. 30b).

Fitting the general characteristics of *decora* with the vittae on the mesonotum more consistently brown to black and with the pleura more brown and the specimens being smaller than *decora*. The ♂ genitalia are very distinctive. Lobes of tergum short and thick and each terminates in a prominent spine (fig. 30a). Dense patch of short black hairs present on each lobe of the tergum just below apical spine and another present on each inner margin opposite top edge of median cleft (fig. 30a). Posterolateral lobes of sternum slender, and extend .66-.75 as long as claspers, submedian lobes are also well-developed (fig. 30c). In ventral view, claspers shorter than length of 9th sternum. In lateral view, each clasper with strong dorsobasal, sharp-pointed lobe (fig. 30b). The ♀ egg guides differ from those of *decora* as shown in fig. 30d.

Length: Body, 3.0-3.5 mm; wings, 4.5-5.5 mm.

Type locality Wisselmeren, Obano, West New Guinea. Type in the B. P. Bishop Museum.

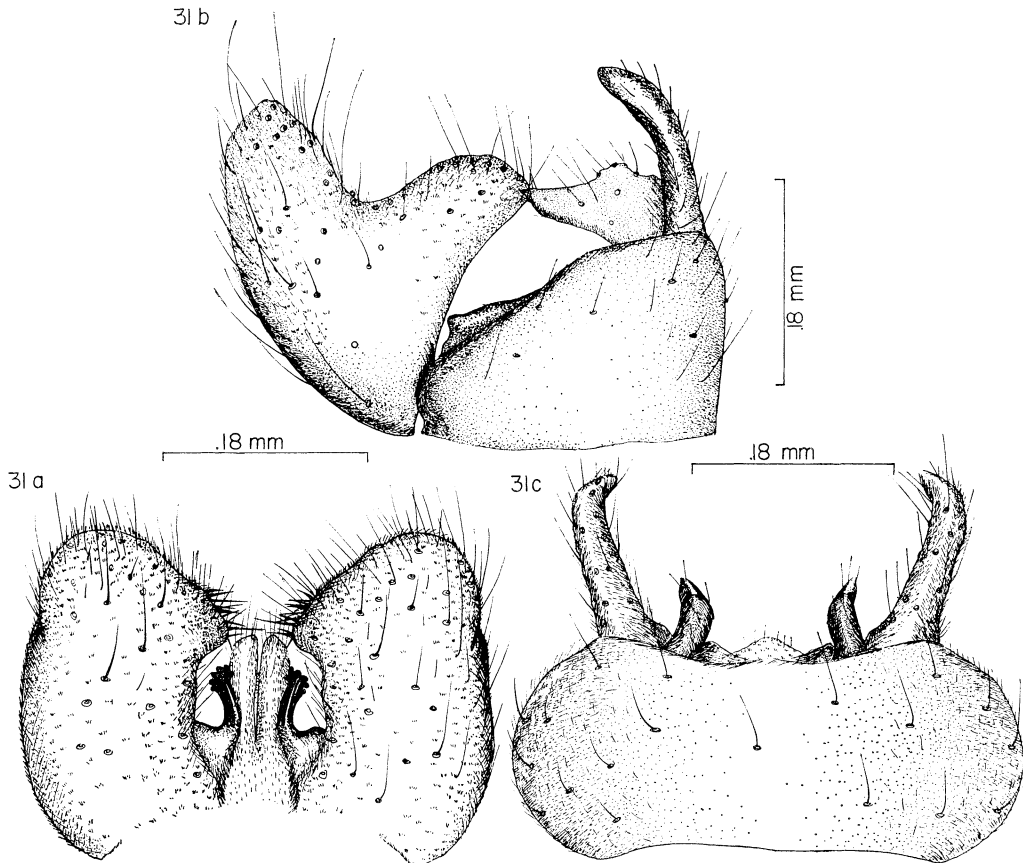


Fig. 31. *Plecia monticola* Hardy, ♂ genitalia: a, dorsal; b, lateral; c, ventral.

It has also been recorded from Mt Wilhelm and Daulo Pass, NE New Guinea; Asaro-Chimbu Div. and Mist Camp, NW New Guinea, S of Idenburg. No additional specimens are in the collections at hand.

***Plecia monticola* Hardy** Fig. 31a-c.

Plecia monticola Hardy, 1958, *Pacif. Sci.* **12**(3): 209, fig. 19a-e.

This small all black species fits the *disjuncta* complex but is readily differentiated by the narrow pointed posterolateral lobes of the 9th tergum as well as other characteristics of the genitalia as shown in fig. 31a-c. This species has been adequately described in the original.

Length: Body, 3.0 mm; wings, 4.0 mm.

Type locality NE New Guinea: Mt Wilhelm. Type in the B. P. Bishop Museum, no additional specimens have been recorded.

***Plecia multilobata* Hardy, new species** Fig. 32a-c.

An all black species which would fit in the *fulvicollis* complex because of the development of the median projection on the hind margin of the 9th sternum but would differ readily from other black species of this complex by having the posterolateral margins of the 9th sternum bilobed, and the median projection of the sternum developed on the posterolateral margins into prominent, inwardly directed lobes (fig. 32b, c). The genital characteristics would fit this nearest to *intricata* n. sp. and the 2 are obviously related; *intricata* has the thorax entirely orange. As seen from direct ventral view the genitalia of the 2 are very similar, those of *multilobata* would differ by having the posterolateral lobes of the 9th sternum almost straight-sided, much more blunt at apices than in *intricata*. As seen in lateral view, the dorsal lobe on each posterolateral margin of the sternum is more basal in position and the apical lobe of the sternum is rounded as in fig. 32c.

♂. The largest of the all black *Plecia* known from New Guinea. Antennae and legs broken

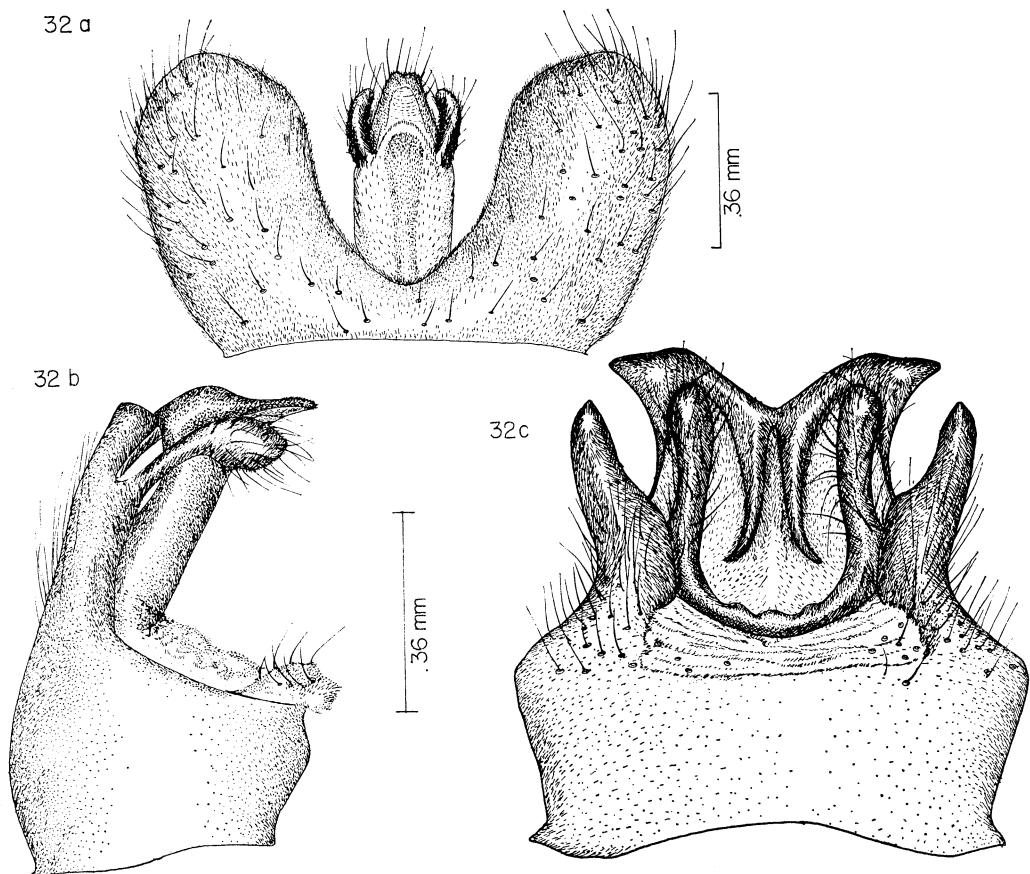


Fig. 32. *Plecia multilobata* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

off the type. Thorax entirely opaque dark brown to black. Halteres black. *Wings*: Uniformly tinged dark brown, stigma and anterior cells not darker than remainder of wing. Vein R_{2+3} slightly curved and entering costa at about a 60° angle to R_{4+5} . Genitalia as described above and as shown in fig. 32a-c.

Length: Body, 7.0 mm; wings, 9.0 mm.

♀. Not definitely associated with the ♂, but a series of specimens on hand very probably belong here. The antenna has 9 flagellomeres. The lower median portion of the front is raised.

Holotype ♂ (BISHOP 7754), NE New Guinea: Finisterre Range, Saidor, Matoko Vill., 6-24.IX.1958, W. W. Brandt.

SPECIMENS EXAMINED: 12♀ spec. NE NEW GUINEA: Aiyura, near Kainantu, 1700-1800 m, 9.I.1965, malaise trap, J. L. Gressitt; Mt Missim, 1400 m, 21-24.IX.1964, J. Sedlacek; and Wau, 1750 m, 14.I.1966, malaise trap, J. & M. Sedlacek. SE NEW GUINEA: S. Highlands, Dimifa, SE of Mt Giluwe, 2200 m, 11.X.1958, Gressitt; S. Highlands, Aiyurop, near Mendi, 1530 m, 7.X.1958, Gressitt; S. Highlands, N of Mendi, 1800 m, 8.X.1958, Gressitt; and Owen Stanley Range, Goilala, Bome, 1950 m, 24.II-7.III.1958, Brandt. NW NEW GUINEA: Neth. Ind.-Amer. New Guinea Exped., 2600 m, Moss Forest Camp, 30.X.1938, L. J. Toxopeus. Type in the B. P. Bishop Museum; ♀ specimens are in the collections of the B. P. Bishop Museum and the University of Hawaii.

Plecia obtusicornis Hardy, new species Fig. 33a-c.

A rather small all black species which fits in the *fulvicollis* complex because of the development of the ♂ genitalia and which would fit near *oculastra*. It is differentiated by the differences in the ♂ genitalia, by having the median projection of the 9th sternum developed into blunt lobes which are separated by a broadly U-shaped concavity and by having the posterolateral lobes of the sternum pointed at apices as seen in ventral view (fig. 33c). Also the sternum is much more densely haired, is rather thickly covered with long dark colored hair; much more so than in *oculastra*.

Fitting the description of other all black species except for genital characters. The antenna has 7 distinct flagellomeres. The genitalia are as described above and as in fig. 33a-c. A rather prominent subbasal lobe is developed on each side of the dorsal surface of the median projection, this is visible only in lateral view (fig. 33b); this lobe is different in development in *oculastra* (fig. 35b). The 9th tergum has a U-shaped cleft on the hind margin extending almost to the anterior margin of the segment (fig. 33a).

Length: Body, 5.5 mm; wings, 6.5 mm.

♀. The ♀ has not been associated with the ♂.

Holotype ♂ (BISHOP 7755), NE New Guinea: Aiyura, near Kainantu, 1700-1800 m, 9.I.1965, malaise trap, J. L. Gressitt.

One ♂ paratype, NE New Guinea: Okapa, 1800 m, 64 km S of Kainantu, 29.IX.1959, T. C. Maa. 3♀♀ specimens are on hand which would appear to belong here. They are not being designated as paratypes. NE NEW GUINEA: Finisterre Range, Saidor, Kiambavi Vil., 22-29.VII.1958, W. W. Brandt. SE NEW GUINEA: S. Highlands, ridge W of Dimifa, S of Mt Giluwe, 2350 m, 11.X.1958, Gressitt; and Owen Stanley Range, Goilala, Bome, 1950 m, 16-30.IV.1958, Brandt.

Type and the ♀ specimens in the B. P. Bishop Museum. Paratype in the University of Hawaii collection.

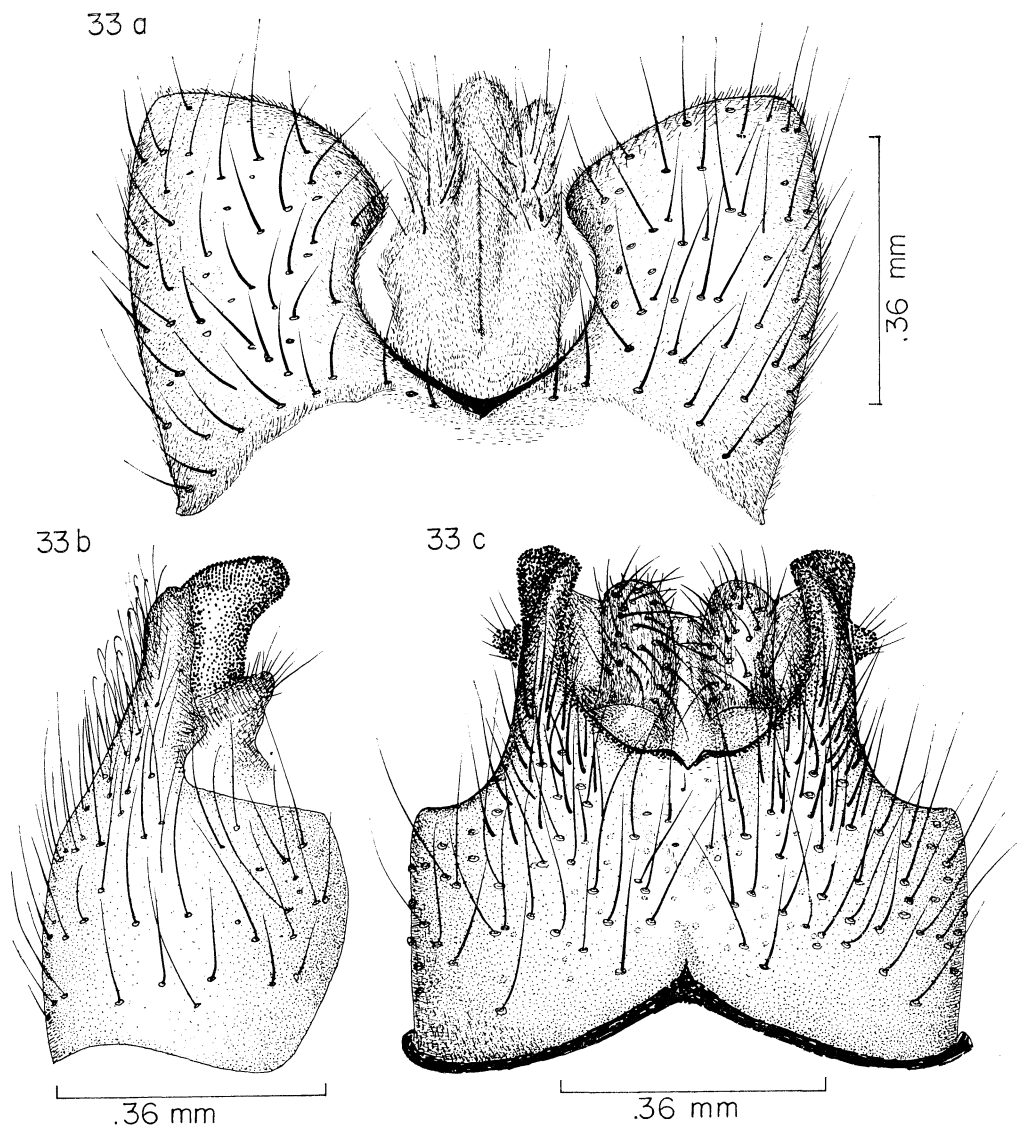


Fig. 33. *Plecia obtusicornis* n. sp.: a, 9th tergum of ♂, dorsal; b, ♂ genitalia, lateral; c, ♂ genitalia, ventral.

***Plecia obtusilobata* new species** Fig. 34a-c.

Fitting the *decora* complex because of the ♂ genitalia but differing strikingly by having the thorax entirely orange and the 9th tergum developed into 2 pairs of strong lobes. It would fit nearest *duplicis* n. sp. but differs by having the genitalia distinctly different in development. As pointed out in the description below.

♂. Fitting the general description of most Southwest Pacific *Plecia* which have the thorax all

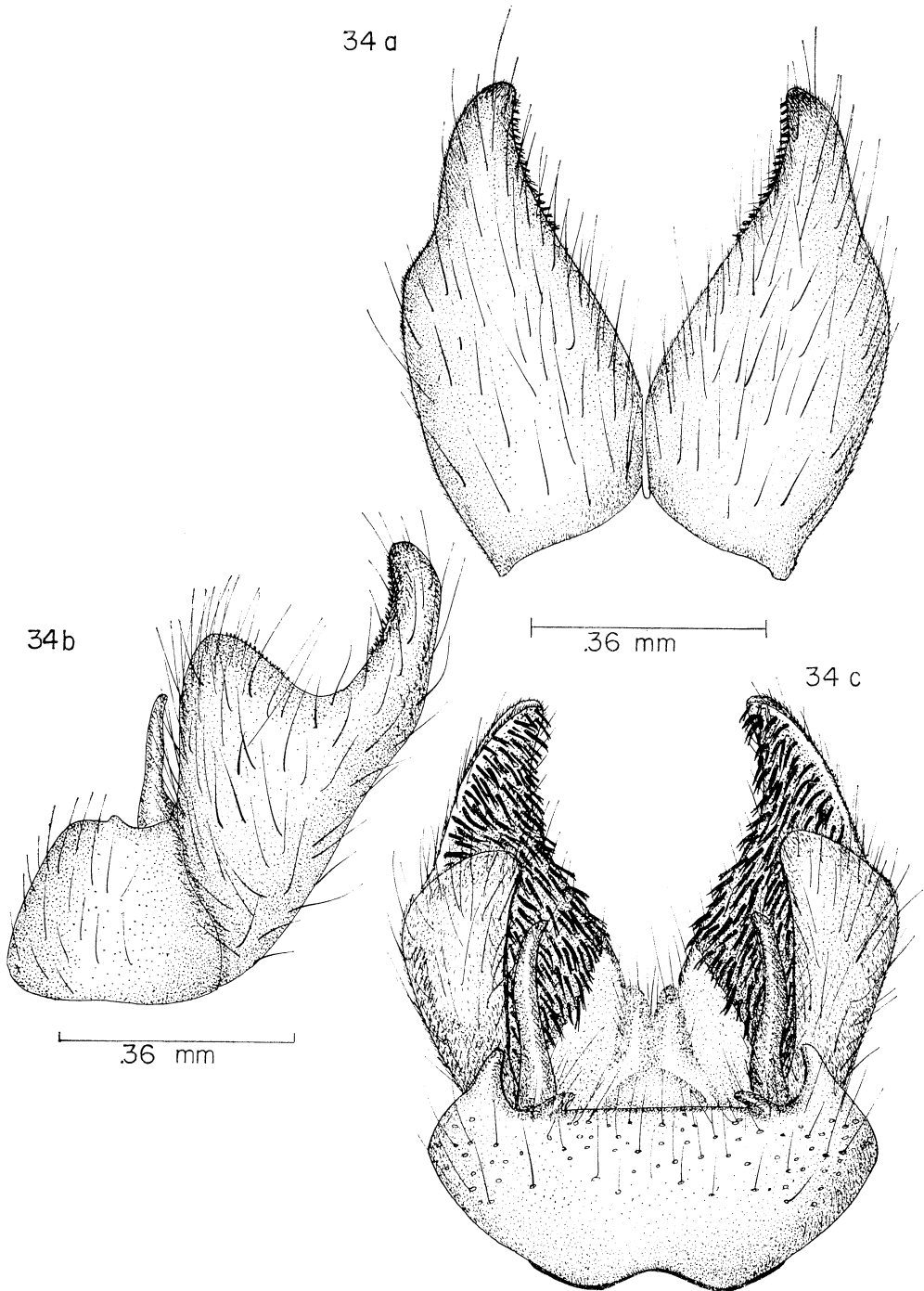


Fig. 34. *Plecia obtusilobata* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

orange. There are 7 flagellomeres in the antenna, the last 2 are closely joined. Tinge of brown is present on sides of thorax along upper margins and also scutellum and metanotum tinged with brown. I see nothing distinctive about the legs or wings. Wings evenly pale brown, stigma slightly darker than membrane. 9th tergum shaped as in fig. 34a, posterolateral lobes short compared to submedian lobes. Entire ventral surface of tergum very densely covered with black flattened setae. 9th sternum and claspers shaped as in fig. 34c. Posterolateral and submedian lobes slightly developed on sternum. Claspers long and slender, serrated around their apices, and as seen from lateral view, with a prominent, large, blunt dorsobasal lobe (fig. 34b).

Length: Body, 4.5 mm; wings, 6.0 mm.

♀. Antennae with 8 flagellomeres. Vertex and front entirely opaque gray-black, the front is raised down the median portion, this is more prominent just above the antennae.

Length: Body, 6.0 mm; wings, 7.0 mm.

Holotype ♂, (Bishop 7756), NE New Guinea: Korop, N of Jimmi-Waghi Div., 1550 m, 20.VII.1955, light trap, J. L. Gressitt. Allotype ♀ (Bishop) same data as type. 2♂ paratypes, 1 same data as type, 1 NE New Guinea, Korop, Upper Jimmi Val., 1300 m, 12.VII.1955, light trap, Gressitt.

Type, allotype, and 1 paratype in the B. P. Bishop Museum. The other paratypes in the collection of the University of Hawaii.

Plecia oculastra Hardy, new species Fig. 35a-d.

A comparatively small all black species which because of the development of the ♂ genitalia would fit in the *fulvicollis* complex and would relate to *obtusicornis* n. sp. It is readily differentiated from this species by having the median projection of the 9th sternum produced laterally at apex into a pair of eye-like stalks, with the hind margin only slightly concave. The posterolateral lobes of sternum are straight-sided, as seen from ventral view, slightly curved and blunt at apices (fig. 35c). Refer to description of *obtusicornis* and to fig. 33a-c and 35a-d, for comparison of these species.

Fitting the general description of other all-dark brown-to-black species. Antennae with 7 flagellomeres. The ♂ genitalia are as described above and as shown in fig. 35a-d.

Length: Body, 4.0 mm; wings, 5.0 mm.

♀. Similar to ♂ except for sexual differences. The antennae have 8 flagellomeres and the lower median portion of the front is raised.

Holotype ♂ (BISHOP 7757), NW New Guinea: Waris, S of Hollandia, 450-500 m, 8-15.VIII.1959, T. C. Maa. 2♂ paratypes, 1 same data as type, 1-7.VIII and 1 NE New Guinea: Torricelli Mts, Mobitei, 750 m, 28.II-4.III.1959, W. W. Brandt. 6♀ specimens which apparently belong here, only 1, same data as 2nd ♂ paratype is being designated as a paratype. No allotype is being designated. The other ♀♀ are from the following localities: NE New Guinea: Wau, 1200 m, 18.VII.1961 and 9-14.XI.1965, malaise trap, J. Sedlacek & P. Shanahan; and 1♀, NW New Guinea: Star Mts, Sibil Val., 1245 m, 18.X-8.XI.1961, S. Quate.

Type, 1 paratype and the ♀ specimens in the B. P. Bishop Museum. One paratype in the University of Hawaii collection.

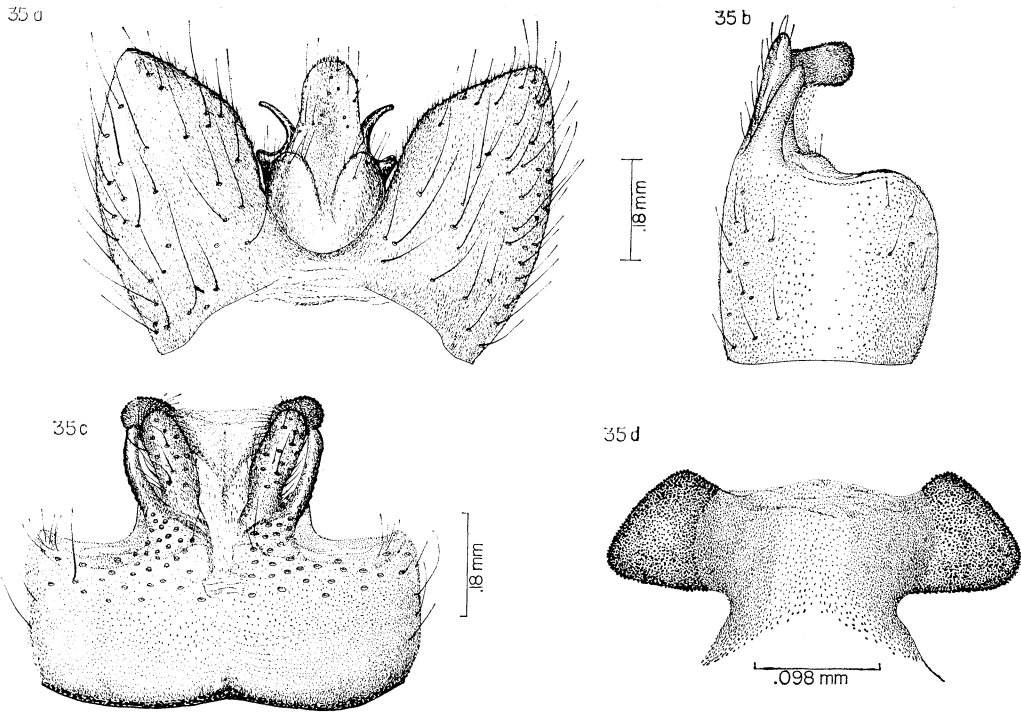


Fig. 35. *Plecia oculastra* n. sp., a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, median projection of sternum, dorsal.

***Plecia patula* Hardy, new species** Fig. 36a-c.

This species belongs in the *ruficornis* complex because of the development of the ♂ genitalia. The thorax is entirely orange and because of the short, rounded posterolateral lobes of the 9th sternum this fits near *crenula* n. sp. from the Cape York Peninsula. *P. patula* is differentiated by having the posterolateral lobes broadly rounded at apices, as seen in lateral view (fig. 36b), and having the claspers longer than wide. I see no distinctive features in the body and the wings.

The 9th sternum approximately as long as wide, not including apical lobes and has a large semimembranous area in middle of posterior portion. This extends at least .33 the length of segment. Posterolateral lobes short, rounded, scarcely over .25 as long as remainder of sternum and as seen in direct ventral view claspers slightly longer than wide (fig. 36c). From lateral view the posterolateral lobes of the sternum are rounded at the apices (fig. 36b). Rather prominent submedian lobes developed on posterior margin of sternum but these are dorsad of claspers and are hardly visible except in dorsal view. The 9th tergum has a large U-shaped cleft in middle of hind margin, as in fig. 36a.

Length: Body, 4.2 mm; wings, 5.3 mm.

♀. Front, vertex and occiput densely gray pubescent. Front slightly raised down median portion. Otherwise as in ♂ except for sexual differences.

Holotype ♂ (BISHOP 7758), NE New Guinea: Swart Val., Karubaka, 1400 m, 6.XI.1958,

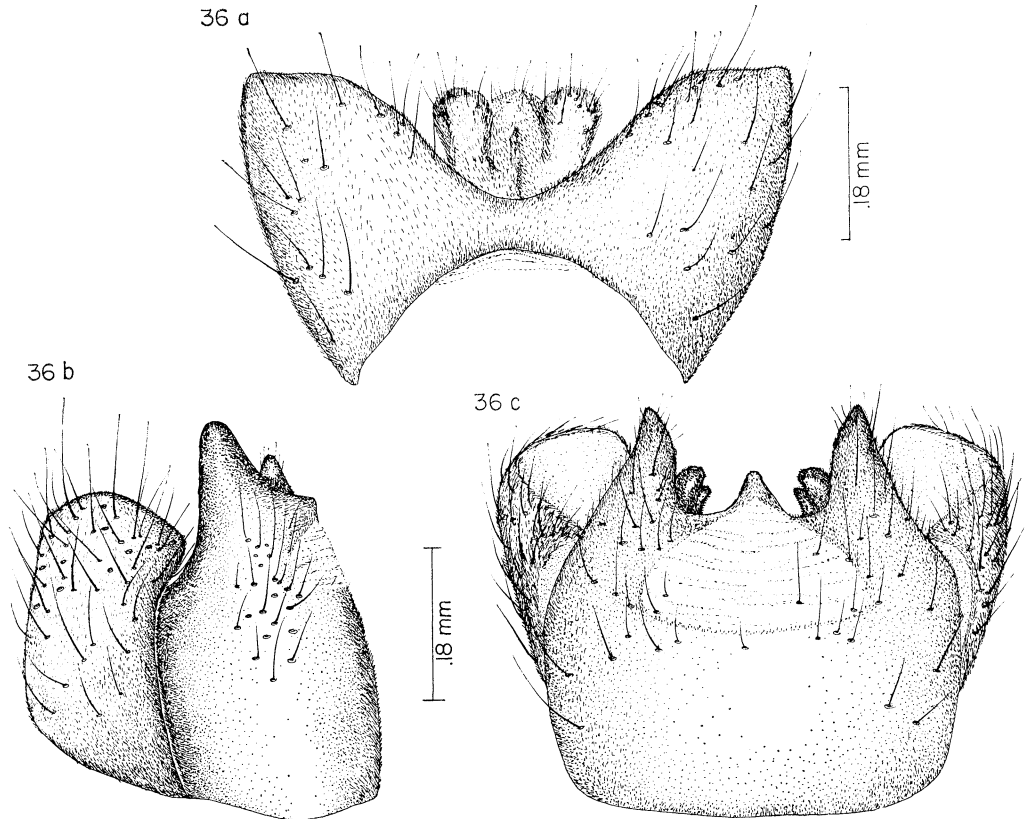


Fig. 36. *Plecia patula* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

J. L. Gressitt. Allotype ♀, Standlager am Aprilfluss, X.1912, No. 184, Kais. Augustaf. Exp. (Bürgers). 21 paratypes, 15♂, 6♀ from the following localities: same as type, 7-20. XI.1958; NW New Guinea: Vogelkop, Kebar Val., W of Manokwari, 550 m, 4-31.XI.1962, S. & L. Quate, Star Mts, Sibil Val., 1245 m, 18.X-8.XI.1961, S. & L. Quate. NE NEW GUINEA: Etappenberg, 850 m, XI.1912 (Bürgers; and aus d. Mäanderberg, 670 m, VII-VIII.1913, no collector given).

Type and a series of paratypes being returned to the B. P. Bishop Museum. Allotype in the Zoologisches Museum der Humboldt Univ. Berlin. Paratypes are in the Zoologisches Museum der Humboldt Univ. Berlin and the University of Hawaii collection.

***Plecia propforcipata* Hardy, new species** Fig. 37a-c.

In my treatment of the species *forcipata* Osten-Sacken (1958, *Pacif. Sci.* **12** (3): 199, fig. 11a-c) I included specimens from New Guinea and Christmas I. in my concept of this species. I now doubt that the latter would belong here. As has been demonstrated, a large complex of species occurs throughout the Southwest Pacific which has the posterolateral lobes of the 9th tergum strongly developed and which would fit the description of

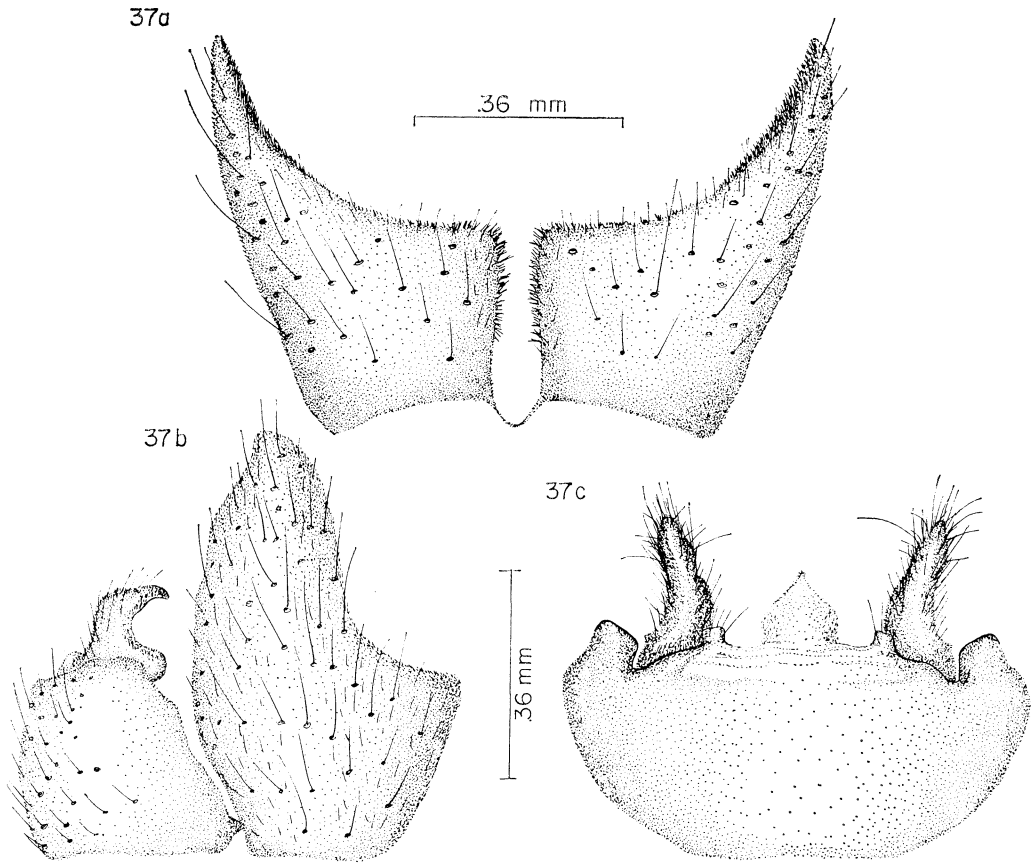


Fig. 37. *Plecia propoforcipata* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

forcipata. The type of that species, from Sumatra, has not been dissected and the genitalia have not been accurately figured in the literature. It will be necessary to study further material from Sumatra in order to clarify its status. This is a species of the *decora* complex which has the thorax entirely orange and the wings evenly tinged pale brown. Because of the tapered lobes of the 9th tergum, densely scaled inner surfaces of the tergum, and the strongly curved apices of the claspers it fits near *hamata* n. sp. but differs from that species by having a broad dorsobasal lobe on each clasper, by having the claspers straight-sided, more distinctly thickened than in *hamata* and differing in shape and development as seen in fig. 27c and 37c. Also the lobes of the 9th tergum are rounded at the apices, rather than pointed as in *hamata* (fig. 27a, 37a). This species is also considerably larger than *hamata*. The other diagnostic features are as shown in the fig. 37a-c.

Length: Body, 6.2 mm; wings, 7.2 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7759), NW New Guinea: Neth. Ind.-Amer. New Guinea Exped.,

Sigi Camp, 1500 m, 16.II.1939, L. J. Toxopeus. Allotype ♀, same data as type. Type in the B. P. Bishop Museum, allotype in the Bogor Museum.

Plecia propria Hardy, new species Fig. 38a-c.

A small species of the *decora* complex and fitting most of the details of that species except for size, body coloration, coloration of wings, and for differences in the ♂ genitalia. The species is characterized by the comparatively short lobes of the 9th tergum, these are poorly developed compared to other species of this complex and are not more than .50 as long as the remainder of the tergum (fig. 38a). Also the claspers lack secondary lobes.

Thorax dark brown, tinged with rufous in ground color. Mesonotum entirely dark colored, not marked off by vittae as in *decora*. Wings: Evenly pale brown fumose, stigma almost concolorous with membrane. Venation like that of *decora* and most other *Plecia*. Vein R_{2+3} straight, oblique in position, entering costa at about a 60° angle to Vein R_{4+5} . 9th tergum developed as in fig. 38a. Lobes abruptly tapered, and not over .50 as long as the remainder of the sclerite. A dense clump of thick black hairs situated on each side opposite upper margin of median

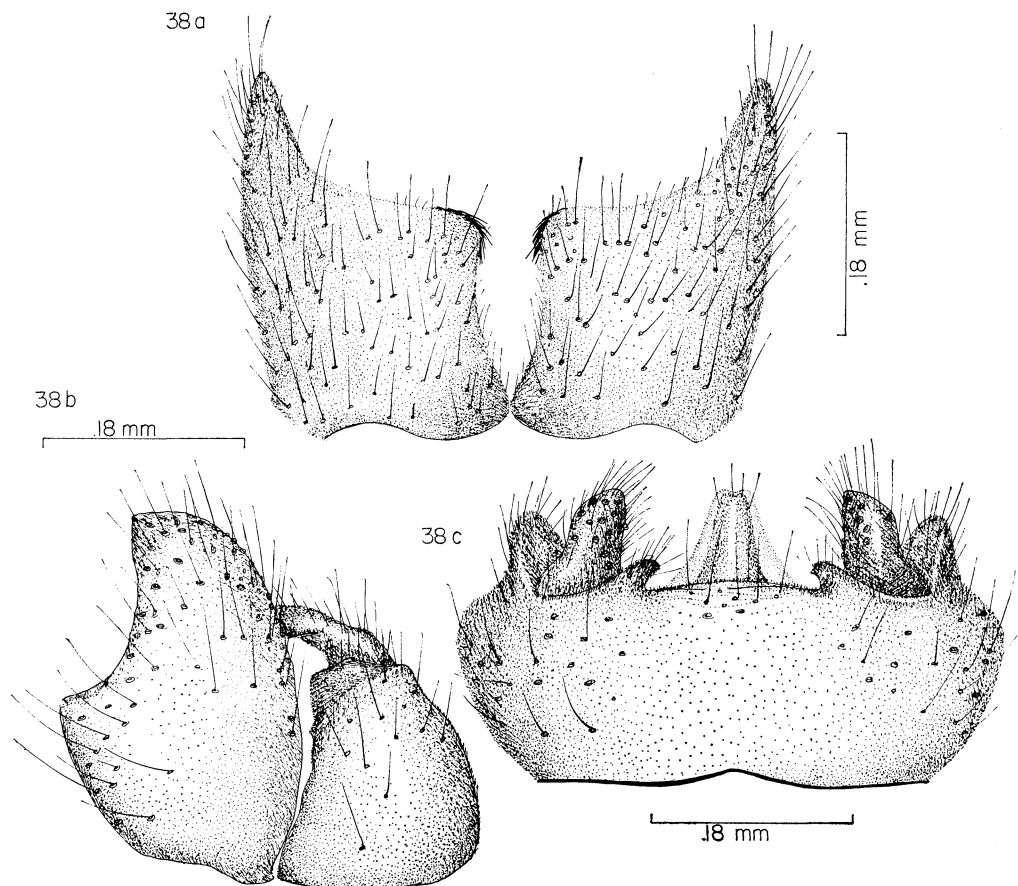


Fig. 38. *Plecia propria* n. sp., ♂ genitalia: a, dorsal; b, lateral; c, ventral.

cleft. Posterolateral lobes of sternum about as wide as long and rounded at apex (fig. 38c). Claspers shorter than 9th sternum and slightly incurved to an acute point at apex as seen in lateral view (fig. 38b). No secondary lobes developed on claspers.

Length: Body, 2.75 mm.; wings, 3.9 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7760), Papua, SE New Guinea, S. Highlands, Aiyurop nr Mendi, 1530 m, 7.X.1958, J. L. Gressitt. Type in the B. P. Bishop Museum.

Plectia rhinigera Hardy, new species Fig. 39a-d.

This species fits in the *ruficornis* complex of species because of the development of the ♂ genitalia, the body coloration is similar to that of *inconspicua* but the 2 species are not related. *P. rhinigera* differs strikingly from any known members of the complex by having the posterolateral lobes of the sternum parallel-sided, each bearing a beak-like preapical

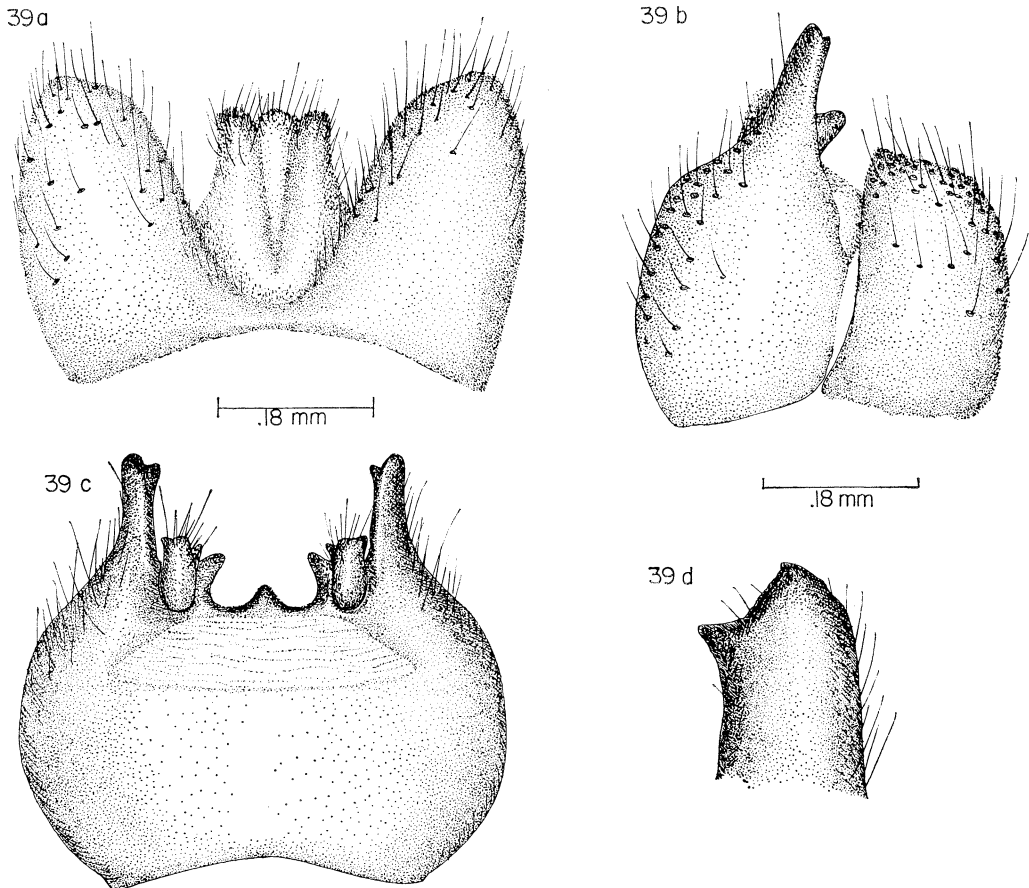


Fig. 39. *Plectia rhinigera* n. sp., a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, clasper, lateral.

point on the inner side (fig. 39c), also the development of the claspers is different from other species in this group; the development of the dorsal projection on the clasper is distinctive (fig. 39b, d).

In other respects this would fit the general description of *malayaensis* or *inconspicua* Hardy, since the mesonotum is rufous and the pleura are brown, faintly tinged with rufous in the ground color. I see nothing distinctive about the body or wing characters.

The 9th tergum with a broad U-shaped cleft extending almost to its base, lobes of tergum rounded at their apices (fig. 39a). 9th sternum shaped as in fig. 39c. Without the lobes on the posterolateral margins, the sternum is approximately 2× wider than long. Posterolateral lobes approximately .66 as long as remainder of sternum and shaped as in fig. 39b and 39c, as seen in ventral and lateral views. Submedian lobes are developed on posterior margins of sternum. These arise dorsad of the claspers and are largely hidden by the latter; they are best seen from dorsal view with the 9th tergum dissected off. The claspers are shaped as in fig. 39c and 39d.

Length: Body, 3.75 mm; wings, 4.2 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7761), NW New Guinea, Star Mts, Sibil Val., 1245 m, 18.X-8.XI. 1961, S. Quate. Type in the B. P. Bishop Museum.

***Plecia serrifera* Hardy, new species** Fig. 40a-e.

This species fits near *magnispina* but differs by having the lobes of the 9th tergum distinctly longer than the remainder of the segment and lacking the dense clump of short black hairs on the inner preapical surfaces of each lobe (fig. 40a). Also the posterolateral lobes of the 9th sternum are comparatively short and broad (fig. 40c), rather than long and slender as in *magnispina* and as seen from lateral view the claspers are serrated on the dorsoapical portion (fig. 40d).

Fitting the general description of *decora* and *magnispina*, with the vittae on the mesonotum rather dark brown, faintly tinged with rufous and the mesonotum otherwise yellow to rufous.

Lobes of tergum distinctly longer than remainder of segment and are sharp pointed at apices. A large conspicuous clump of densely placed thick black hairs present on basal part of each tergal plate opposite upper margin of median cleft (fig. 40a). Posterolateral lobes of sternum directed outwardly, oblique on hind margins, shaped as in fig. 40b and c. The claspers acutely pointed, and serrated on inner margins just before apices (fig. 40d).

Length: Body, 4.0-4.2 mm; wings, 5.2-5.4 mm.

♀. Consistently darker than ♂ with mesonotal vittae brown to blackish. I see no way to differentiate the ♀♀ from those of *magnispina*. The egg guides are shaped as in fig. 40e. The body is slightly longer than that of the ♂, measuring 4.5 mm.

Holotype ♂ (BISHOP 7762), and allotype ♀ (BISHOP), NE New Guinea, Mt Otto, 2200 m, 24.VI.1955, J. L. Gressitt. 21 paratypes, 18♂ and 3♀, from the following localities: same as type, 21-24.VI.1955; NE New Guinea: Daulo Pass, 2500 m, (Asaro-Chimbu Div.), 12.VI.1955, Gressitt; Mt Wilhelm, above Keglsugl, 3000 m, 4.VII.1955, Gressitt; and Mt Wilhelm, Camp, East slopes, No. 6, Pengagl, 2770 m, 4-28.VII.1959 (6th Archbold Exped. to Papua, New Guinea), L. J. Brass. SE New Guinea: S. Highlands: Dimifa, SE of Mt Giluwe, 2200 m, 10.X.1958, Gressitt.

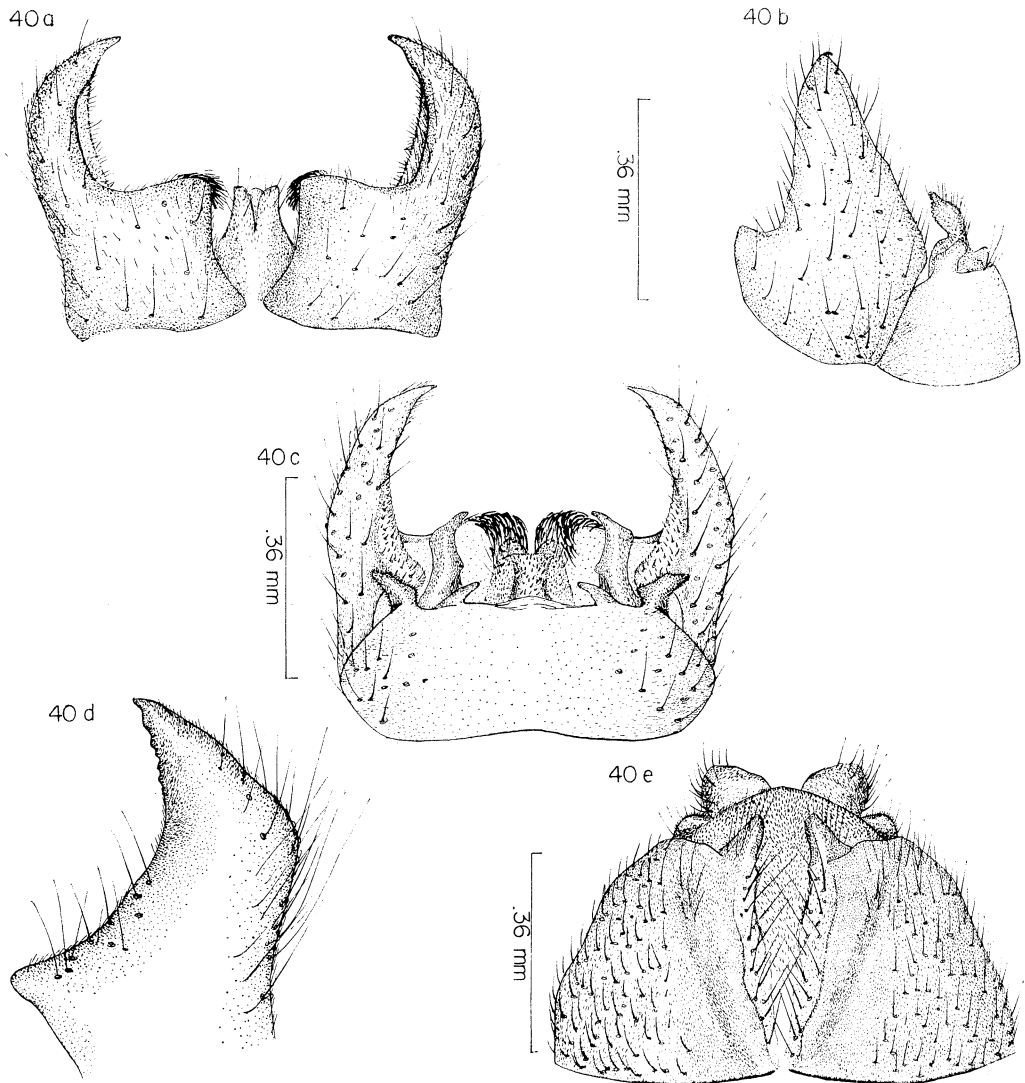


Fig. 40. *Plecia serrifera* n. sp., a-c, ♂ genitalia: a, dorsal; b, lateral; c, ventral. d, clasper, lateral; e, terminalia of ♀, ventral.

Type, allotype and a series of paratypes returned to the B. P. Bishop Museum, other paratypes returned to the American Museum, and others deposited in the University of Hawaii collection.

***Plecia spilota* Hardy, new species** Fig. 41a-d.

Very similar to *stricta*, differing by being slightly larger and having distinctly different genitalia. The comparatively short, slightly pointed claspers with the blunt dorsobasal

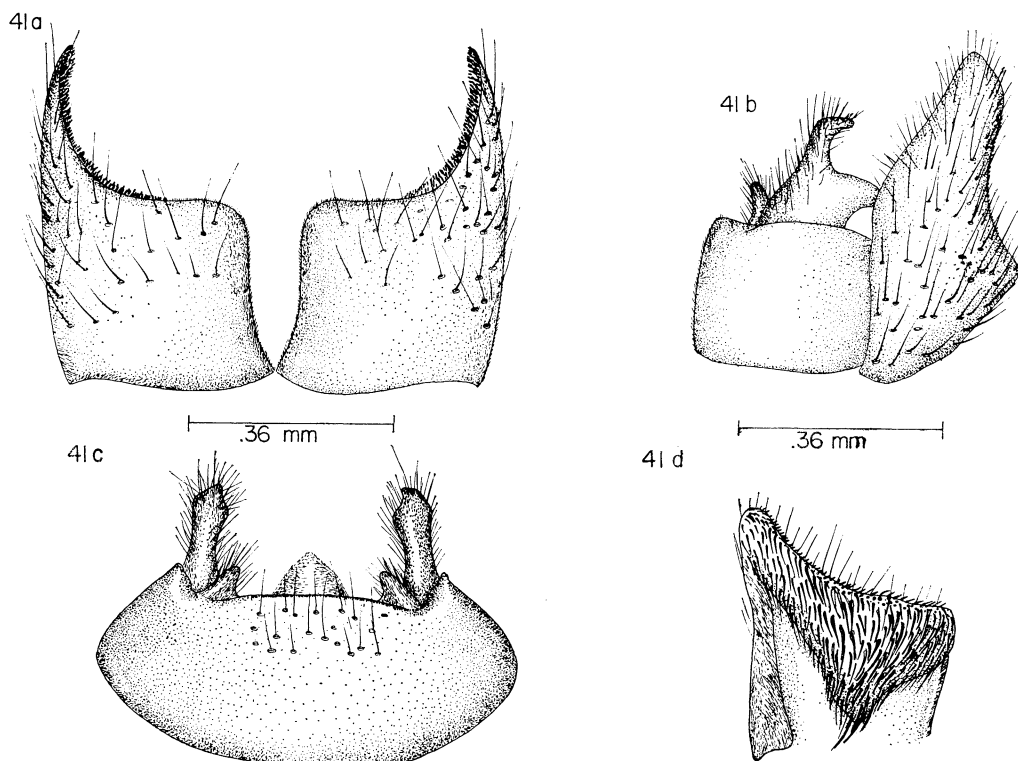


Fig. 41. *Plecia spilota* n. sp.: a, ♂ genitalia, dorsal; b, ♂ genitalia, lateral; c, ♂ 9th tergum, ventral; d, 9th tergum, ventral.

lobes and the short slightly tapered lobes of the tergum will readily differentiate this species (fig. 41a-c).

♂. *Head*: As in *decora*. *Thorax*: Mesonotum dark brown, tinged with red; sides yellow, tinged with brown. Upper portions of pleura opaque brown to black; sternopleura yellow to rufous, tinged with brown. Halteres with dark brown to black knobs, yellow on their bases. *Legs*: As in *stricta*. *Wings*: Similar to those of *stricta* with rather distinct spotting of brownish gray along Veins M_1 , M_2 , M_{3+4} and Cu. Lobes of 9th tergum comparatively short; segment shaped as in fig. 41a, b. Tergum short compared to other species of this complex and would extend less than $2\times$ longer than sternum. Sternum approximately $3\times$ wider than long; posterolateral lobes poorly developed and submedian lobes rather prominent (fig. 41d). Claspers rather short, less than length of sternum and slightly pointed at inner apices as seen in direct lateral view, a prominent dorsobasal lobe present (fig. 41b). This is rounded at apex and approximately equal in size to apical lobe of clasper. The parameres are strongly curved dorsally, sharp-pointed. Ventral surface of the 9th tergum is densely covered with black scale-like setae.

Length: Body, 6.0-6.5 mm; wings, 7.7-8.5 mm.

♀. Unknown.

Holotype ♂, NE New Guinea: No. 6, Pengagl Camp, E slopes of Mt Wilhelm, 2770 m, 3-7.VII.1959, 6th Archbold Exped. to Papua, New Guinea, L. J. Brass. 1♂ paratype, NE New Guinea, Lake Sirunki, 2550 m, 14.VI.1963, J. Sedlacek. Type returned to the Amer-

ican Museum of Natural History. Paratype in the B. P. Bishop Museum collection.

***Plecia stricta* Hardy, new species** Fig. 42a-d.

This species belongs in the *decora* complex but the thorax is predominantly dark brown to blackish, rather faintly tinged with rufous and the wings are distinctly spotted (fig. 42a). Also the posterolateral lobes of the tergum are different in development than in typical *decora* (fig. 42b). It would fit nearer *spilota* n. sp. but is readily differentiated by the long slender claspers (fig. 42d), by the acute dorsobasal lobe on each clasper (fig. 42c), as well as by the difference in the development of the 9th tergum as shown in fig. 42b and c.

♂. *Head*: As in *decora*. *Thorax*: Mesonotum dark reddish brown to black, tinged with rufous on the sides and with a thin line of gray pollen down each dorsocentral line. Pleura brown to black, tinged with red on upper .50, with sternopleura largely red, tinged with brown. Halteres

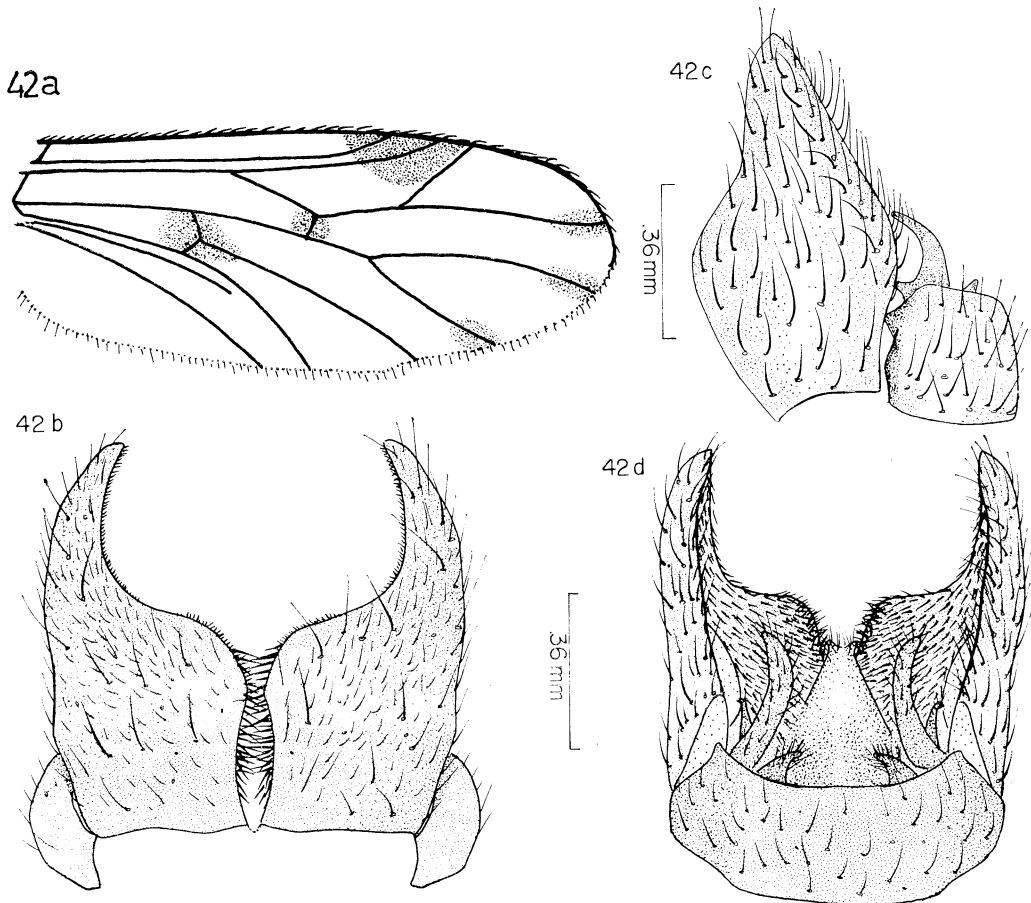


Fig. 42. *Plecia stricta* n. sp.: a, wing; ♂ genitalia: b, dorsal; c, lateral; d, ventral.

brown on knobs, with pale stems. *Legs*: Predominantly black, bases of femora and trochanters yellow, tinged lightly with brown. *Wings*: Subhyaline, faintly brownish in costal cell and with stigma pale brown and also with faint gray-brown spots scattered over veins M_1 , M_2 , M_{3+4} and at m-cu crossvein (fig. 42a). Vein R_{2+3} is oblique, and enters costa at about a 65° angle to R_{4+5} . *Genitalia*: Lobes of 9th tergum rather sharply tapered and acutely pointed as seen in dorsal view, tapered portions approximately equal to tergum (fig. 42b). Tergum subacute at apex from lateral view (fig. 42c). 9th sternum short and broad, hardly over .33 as long as tergum and nearly $3\times$ longer than wide. Posterolateral lobes very poorly developed, submedian lobes rather prominent (fig. 42d). Claspers long and slender, almost straight-sided and longer than sternum, rather blunt at apices. In lateral view, claspers distinctly arched dorsally and with a prominent dorsobasal acutely pointed lobe (fig. 42c). Inner surface of 9th tergum densely covered with black scale-like setae.

Length: Body, 4.7 mm; wings, 5.5 mm.

♀. Unknown.

Holotype ♂ (AMNH), NE New Guinea: No. 6, Pengagl Camp, E slopes of Mt Wilhelm, 2770 m, 8.IX.1959, 6th Archbold Exped. to Papua, New Guinea, L. J. Brass. 6♂ paratypes, 1 same data as type and 3 from the following localities in NE New Guinea: Finisterre Range, Saidor, Kiambavi Vill., 22-29.VII.1958, W. W. Brandt, and Swart Val., Karubaka, 1400-1600 m, 9.XI.1958, light trap, J. L. Gressitt; and 2, NW New Guinea, Swart Val., 10-21.XI.1958, Gressitt.

Type in the American Museum of Natural History, paratypes in the collections of the B. P. Bishop Museum and the University of Hawaii.

Plecia tetrascolata Hardy, new species Fig. 43a-e.

A small all black species fitting in the *disjuncta* complex because of the development of the sternum as shown in fig. 43d and because of the genital characters: the broadly expanded lateral margins of the 9th tergum, the completely divided tergum with each plate bearing a black preapical patch of scale-like setae on inner surface (fig. 43b). This species is readily differentiated from others of this complex by having the posterolateral lobes of the sternum and the claspers each developed into 2 distinct lobes as in fig. 43d and 43e.

♂. *Head*: In most respects similar to other *Plecia*. Antennae entirely black except for the yellow base of the 1st flagellomere. 5 flagellomeres present. *Thorax*: Entirely opaque black; distinct grooves present down each dorsocentral line. Mesonotum with a faint pruinosity, punctulated on sides, otherwise smooth or nearly so. Pleura subshiny black, tinged faintly with rufous in ground color and covered with grayish pruinosity. Stems of halteres yellow, knobs black. *Legs*: Predominantly dark brown to black, bases of femora tinged with yellow. *Wings*: Evenly dark brown tinged, the stigma is not differentiated. Crossvein r-m forming about a 70° angle to Vein R_{4+5} . *Genitalia*: 9th tergum completely divided by a narrow almost straight-sided cleft in the middle, as seen in dorsal view the lobes are shaped as in fig. 43a. Each side plate of tergum produced ventrally, indistinctly bilobate. Ventral margin of each plate of the tergum has a row of prominent spines present near posterior margin and another set of short spine-like teeth are present at base (fig. 43b). Inner apical surface of each plate of tergum densely covered with black scale-like microscopically branched setae. 9th sternum short and broad, not counting the lobes on the posterior margin, sternum would be at least $4\times$ wider than long. In direct ventral view, posterolateral lobes sharp-pointed, rather triangular in shape (fig. 43d). In lateral view, each posterolateral lobe toothed at apex and with a strong sharp-pointed dorsal

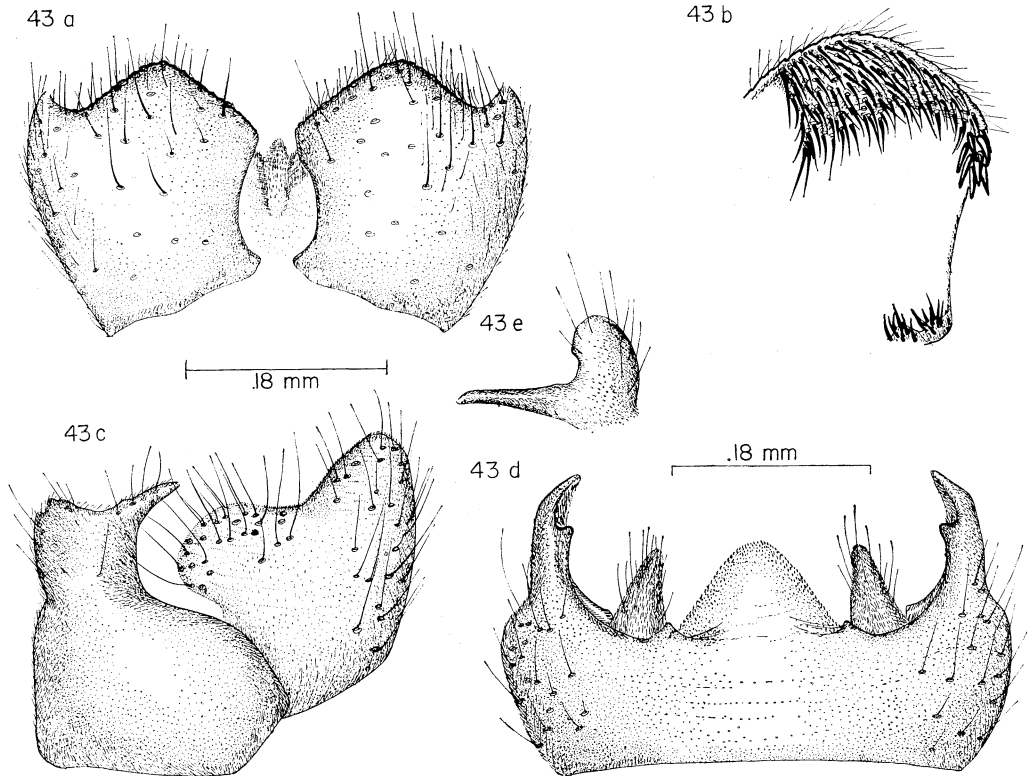


Fig. 43. *Plecia tetrascolata* n. sp.: a, ♂, genitalia, dorsal; b, 9th tergum, ventral; c, ♂ genitalia, lateral; d, 9th sternum, ventral; e, clasper, lateral.

lobe (fig. 43c). Small submedian lobes also present on hind margin of sternum. As seen from direct ventral view the claspers appear to be about $3\times$ longer than wide and rounded at apices (fig. 43d). As seen from lateral view, each clasper is developed into a strong, sharp-pointed, inwardly directed lobe (fig. 43e). Parameres are well developed.

Length: Body, 3.2 mm; wings, 3.7 mm.

♀. With 6 flagellomeres in antennae; last 2 closely joined. Front slightly carinate, more distinctly raised just above antennae. Entire front gray pollinose. Otherwise fitting ♂ except for sexual characteristics.

Holotype ♂ (BISHOP 7763), SE New Guinea: S. Highlands, Dimifa, SE of Mt Giluwe, 2200 m, 10.X.1958, J. L. Gressitt. Allotype ♀ (BISHOP), same data as type. Type and allotype in B. P. Bishop Museum.

***Plecia trifida* Hardy, new species** Fig. 44a-c.

Because of the development of the genitalia this species would appear to relate to the *decora* complex of species. It differs, however, by lacking the strong lobate extensions of the 9th tergum; the tergum is about equal in length to the sternum; the inner surface of the tergum bears the characteristic patch of short thick setae (actually 3-tined scales as seen

under high magnification) as in species of the *decora* complex. Also the development of the sternum is somewhat similar to members of that complex of species, and I feel that they are related. *Plecia trifida* would differ from all known *Plecia* which have the short 9th tergum by having the inner surfaces of the lobes of the tergum densely scaled as in fig. 44a, also by the bilobed claspers and other details as shown in fig. 44b, c.

♂. *Head*: In most respects fitting the characteristics of other Pacific *Plecia*, except that only 6 apparent flagellomeres are present in the antenna. *Thorax*: Mesonotum entirely rufous, sides of thorax tinged with brown on the upper portions, the sternopleura are rufous, tinged with brown on the upper margins. Halteres with yellow stems and yellow-brown knobs. Scutellum rufous except for a brown mark in the median portion. Metanotum rufous. *Legs*: Dark brown to black, brownish yellow on bases of femora and on trochanters. *Wings*: Tinged pale brown, stigma just slightly darker than wing membrane. Vein R_{2+3} slightly curved, entering costa at about 60° angle to R_{4+5} . 9th tergum with a V-shaped cleft extending about .66 the length of segment on hind margin, lateral lobes broad and rounded (fig. 44a). Dorsal surface of each lobe of tergum is densely covered with black scale-like setae, each of which is divided into 3 times as seen under high magnification. Sternum slightly wider than long, approximately equal in length to tergum and with rather small, rounded posterolateral and submedian lobes developed on hind margin (fig. 44b). As seen from ventral view, each clasper is rather slender, extends about $2\times$ longer than posterolateral lobes of the sternum and are subacutely pointed at apices. As seen from lateral view, each clasper has a strong dorsal lobe developed as in fig. 44c.

Length: Body, 4.5 mm; wings, 5.5 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7764), NE New Guinea: Daulo Pass, 2400 m (Asaro-Chimbu Div.), 15.VI.1955, J. L. Gressitt. 2♂ paratypes, 1 same data as type except 13.VI.1955, and 1 NW New Guinea, Bodem, 100 m, 11 km SE of Oerberfaren, 7-17.VII.1959, T. C. Maa. Type and paratype in the B. P. Bishop Museum; 1 paratype in the University of Hawaii collection.

***Plecia* new species "yellow-winged" ♀**

One ♀ specimen on hand apparently belongs to an undescribed species; I know of nothing that will relate to this. It is a comparatively large, entirely black species with the wings evenly tinged with yellow. The last segment of the palpus is short and broad, about as wide as long. Nine flagellomeres are present in the antennae. The front has a strong carina down the middle extending the entire length. This is not being described until it can be associated with the ♂.

Length: Body, 9.0 mm; wings, 11.5 mm.

The specimen is from NW New Guinea: Neth. Ind.-Amer. New Guinea Exped., 1938, Lake Habbema, 3250-3300 m, 18.VIII, L. J. Toxopeus. The specimen is in the University of Hawaii collection.

Subgenus *Heteroplecia* Hardy

This subgenus is based upon one species, *P. visenda* Hardy, from New Guinea which is characterized by the absence of ocelli and of an ocellar triangle. This is apparently just

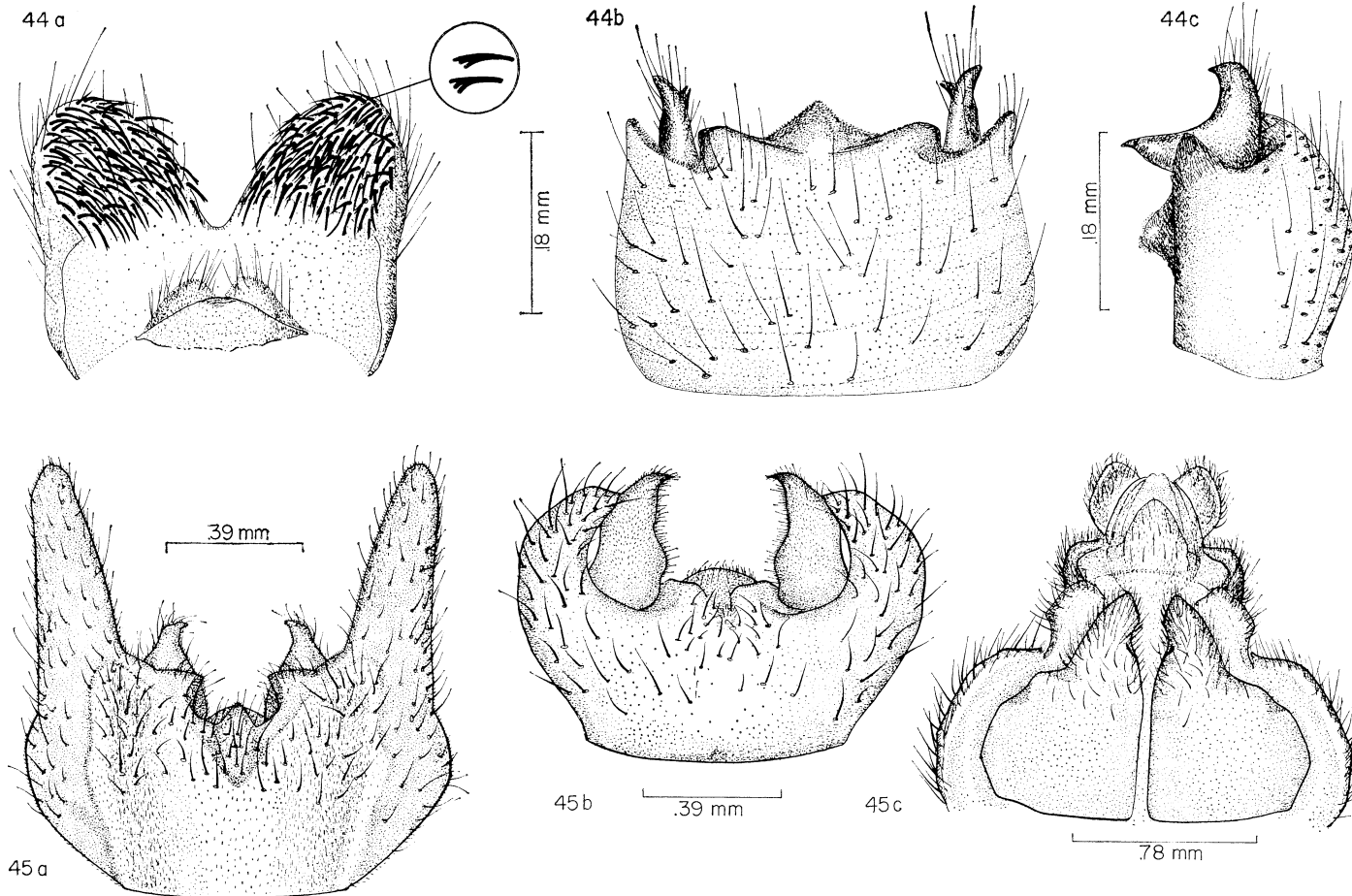


Fig. 44. *Plecia trifida* n. sp.: a, 9th tergum, ventral; b, 9th sternum, ventral; c, 9th sternum, lateral.

Fig. 45. *Plecia visenda* Hardy: a, ♂ genitalia, dorsal; b, ♂ genitalia, ventral; c, terminalia of ♀, ventral.

a specific character and it is questionable whether or not this should be retained as a distinct subgenus. The ♂ genitalia would show considerable relationship with the *decora* complex because of the strongly developed tergum and short, broad 9th sternum. It differs from any of that group of species by having the lobes of the tergum joined by a narrow but heavily sclerotized bridge in the middle, and the lobes are obviously not moveable. Also the inner surface of the tergum of *visenda* is bare, completely lacking the characteristic clumps of setae found on the *decora* complex of species. The antennae are longer than in species of the *decora* complex and each has 8 flagellomeres in the ♂ and 10 in the ♀.

Plecia (Heteroplecia) visenda Hardy Fig. 45a-c.

Plecia (Heteroplecia) visenda Hardy, 1950, Proc. Haw. Ent. Soc. **14**(1): 75, fig. 1a-c; 1958, Pacif. Sci. **12**(3): 319.

A large species, readily recognized by the characters given under the subgeneric discussion above.

Thorax. Entirely orange. Wings evenly tinged pale brown; stigma concolorous with membrane. The ♂ genitalia as in fig. 45a and b. Bridge connecting 2 lobes of 9th tergum with 3 small lobes along posterior margin. Claspers comparatively large and conspicuous, acutely pointed at apices. Egg guides of ♀ shaped as in fig. 45c.

Length: Body, 9.5-10.0 mm; wings 11.0-12.0 mm.

Type locality Mt Eiori, Netherlands New Guinea (West Irian). Type in the British Museum (Nat. Hist.). This species is also known from Hollandia and from Araucaria camp, NW New Guinea.

Three specimens are in the B. P. Bishop Museum from the following localities. NW New Guinea: Star Mts, Sibil Val., 1245 m, 8.IX-18.X.1961, S. & L. Quate and Ifar, Cyclops Mts, 300-500 m, 23-25.VI.1962, J. Sedlacek. Three specimens are also in the Zoological Mus., Humboldt Univ. Berlin from NE New Guinea: Etappenberg, 850 m, XI.1912, Bürgers; and Lordberg, 7.XII.1912, Bürgers.

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