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THE BIBIONIDAE (Diptera) OF NEPAL, RESULTS OF THE AUSTRIAN AND THE B. P. BISHOP MUSEUM EXPEDITIONS, 1961 AND 1965[1]

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Since my study of the Bibionidae of Nepal (1965a), which was based upon the collection made by R. L. Coe, British Museum (Nat. Hist.), 1961-62 expedition, and by L. W. Swan, American Expeditions 1954 and 1960, additional collections have come to my attention. Dr H. Janetschek, Zoologisches Institut der Universität, Innsbruck, Austria, was a member of the Austrian Expedition to Nepal in 1961 and collected 119 specimens of Bibionidae. Dr L. W. Quate, participating member from the Bishop Museum of the Nepal Health Survey, Dooley Foundation, 1965 expedition, collected 250 specimens, and 14 additional specimens have been found in the Swan collections at the California Academy of Sciences, San Francisco. This has added considerable information concerning this fauna and makes our knowledge of the Nepal species much more complete. Two species are present which have not previously been recorded from Nepal and five additional n. spp. are on hand, bringing the total number of species known from Nepal to 19. The Janetschek collection was sent to me by Günter Morge, Deutsches Entomologisches Institut, Berlin, and these specimens have been returned to that collection. The material collected by Dr Quate is in the B. P. Bishop Museum collection, Honolulu.

The drawings have been prepared by Miss Geraldine Oda, University of Hawaii.

Taxonomic Arrangement of the Known Bibionidae of Nepal

Subfamily Pleciinae
Penthetria atra (Brunetti)
P. indica (Brunetti)
P. japonica Wiedemann
*Plecia amplitergum**
P. impostor Brunetti
P. mallochi Hardy ?♀
*P. quatei**

Subfamily Bibioninae
Bibio ablusus Hardy
B. affiniproximus Hardy
*B. aquilus**
*B. araeosceles**
B. capitaneus Hardy
B. fuscitibia Brunetti
*B. nepalensis**
B. nigerrimus Duda
B. scaurus Hardy
B. totonigra Hardy
Dilophus gratiosus Bigot
D. hirsutus Hardy

1. Published with the approval of the Director of the Hawaii Agricultural Experiment Station as Technical Paper 871.

Revised key to Bibionidae from Nepal

1. Front tibia lacking spines or spurs. Vein R_{2+3} present. Plecinae 2
   Front tibia with large apical spurs or with a ring of spines at apex and a row of 4 spines across middle. Bibioninae 8
2 (1). Vein R_{2+3} short, oblique or vertical in position. *Plecia* Wiedemann 3
   Vein R_{2+3} elongate, almost horizontal in position. *Penthetria* Meigen 6
3 (2). At least hind portion of mesonotum rufous 4
   Entirely black species. ♂ genitalia as in fig. 2 f-g ..... **Plecia quatei***
4 (3). Thorax entirely rufous ..... **Plecia mallochi** Hardy
   (and probably related species, only ♀♀ are presently known from Nepal)
   Pleura black 5
5 (4). Anterior portion of mesonotum intensively black, covering front 1/3–1/2; also scutellum black. Ninth sternum of ♂ produced on each side into a slender pointed lobe. Claspers clavate and each bearing a prominent basal lobe (fig. 2a). Ninth tergum smaller than sternum, the latter plainly visible from dorsal view ..... **Plecia impostor** Brunetti
   Only anterior margin of mesonotum discolored with brown to black; scutellum rufous. Posterolateral margins of 9th sternum bifid. Claspers not clavate and lacking basal lobe (fig. 1c.). Ninth tergum greatly expanded (visible *in situ*), nearly 2× larger than sternum and completely hiding it from dorsal view (fig. 1b) ..... **Plecia amplitergum***
6 (2). At least posterior 1/2 of mesonotum bright orange 7
   Entirely black species ..... **Penthetria atra** (Brunetti)
7 (6). Anterior portion of mesonotum black ..... **Penthetria japonica** Wiedemann
   Mesonotum entirely rufous ..... **Penthetria indica** (Brunetti)
8 (1). Front tibia with a row of apical spines and with 4 spines across middle. *Dilophus* Meigen 9
   Front tibia with apical spurs (figs. 4c and 6b). *Bibio* Geoffroy 10
9 (8). Basal section of radial sector very short, about 1/5 as long as r-m crossvein. Body and legs densely black pilose. Spines at middle of front tibia not arranged in a straight line (ref. fig. 49, Hardy 1965a: 22) ..... **Dilophus hirsutus** Hardy
   Basal section of radial sector nearly 1/2 as long as r-m. Body and legs sparsely yellow pilose. Spines of front tibia arranged in a straight line before middle of segment (ref. fig. 46, Hardy 1965a: 21) .. **Dilophus gratiosus** Bigot
10 (8). Inner spur of front tibia rudimentary, very small compared to outer, scarcely over 1/6 as long as outer except in ♂ of *nigerrimus* (fig. 7a), which is characterized by having outer spur rounded (fig. 7c) 11
   Inner spur well-developed, 2/3–3/4 as long as outer (fig. 6b) 12
11 (10). Outer spur of front tibia of ♂ rounded, blunt at apex (fig. 7c) (best seen from lateral view). ♀ front tibiae as in fig. 7b. Thorax entirely black in both sexes. Front of head of ♀ and mesonotum of both sexes opaque, microscopically tuberculated. Entirely black pilose species .. **Bibio nigerrimus** Duda

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* Described as new.

Spurs sharp pointed in both sexes. Thorax of ♀ rufous. Front of ♀ metallic black, smooth; mesonotum of both sexes shining, smooth. Body predominantly yellow pilose.....**Bibio ablusus** Hardy

12 (10). Hind tibiae and tarsi predominantly yellow, tinged with brown at apices of tibiae; last 2–3 subsegments of tarsus brown. Middle and front tibiae and basitarsi yellow, tinged with brown. Femora brown to black. Rather small species, body and wings 5.25–5.5 mm. Wings almost hyaline, only faintly tinged, costa not darker than remainder of wing. Hind tibia rather strongly swollen, thicker than femur. Hind basitarsus not noticeably swollen (ref. fig. 24, Hardy 1965b: 212)..... **Bibio fuscitibia** Brunetti

Not fitting above combination: tibiae and tarsi black, etc.....13

13 (12). Wings entirely hyaline, except for stigma; posterior veins colorless 14

Wings distinctly infuscated, grey to smoky black, darker on anterior margin, at least costal cell brown or brownish yellow; posterior veins colored yellowish to brown, darker than membrane..... 15

14 (13). Large species, ♂ body 15.5 mm; wings 14.0 mm. Crossvein r-m less than 1/2 as long as base of Rs. Last segment of palpus 6× longer than wide .....**Bibio capitaneus** Hardy

Small species, body 5.0 mm; wings 4.6 mm. Crossvein r-m equal in length to base of Rs. Last segment of palpus scarcely longer than wide..... .....**Bibio affiniproximus** Hardy

15 (13). Femora black. Thorax of both sexes black 16

Femora rufous. Thorax of ♀ rufous.....**Bibio nepalensis***

16 (15). Rostrum, sclerotized portion of head beyond eyes, rather strongly produced, equal to about length of 1st 3 flagellomeres in ♂ and equal in length to eye in ♀ (ref. fig. 38–39, Hardy 1965a: 17). Hind basitarsus of ♂ thicker than tibia (ref. fig. 35, Hardy 1965a: 17). Female wing with pale brown spots at base of vein M_{3+4}, over m and r-m crossveins, and on base of radial sector..... **Bibio scaurus** Hardy

Rostrum poorly developed, scarcely visible in ♂, and in ♀ slightly longer than 1st flagellomere. Hind basitarsus not as thick as tibia. Female wings lacking such spots 17

17 (16). Pile of body and legs completely black. Last segment of palpus 4–6× longer than wide 18

Pile of pleura, abdomen, sides of mesonotum and dorsal surfaces of femora yellow. Last segment of palpus 2.5–3.0× longer than wide (fig. 4b)..... .....**Bibio araeosceles***

18 (17). Mesonotum opaque black, microscopically punctulated (fig. 7f). All tibial spurs black. Wings smoky black, dark brown to black anteriorly through costal cell, cell R_1 and upper portion of radial cell. Posterior veins brown ..... **Bibio totonigra** Hardy

Mesonotum polished black, smooth. Tibial spurs rufous. Wings pale grey, brown only in costal cell and on stigma. Posterior veins tinged with yellow .....**Bibio aquilus***

Penthetria atra (Brunetti)

Plecia atra Brunetti, 1911, Rec. Indian Mus. **4**: 272.

This species was discussed in my previous paper (Hardy 1965a: 5) and is still known only from the female. One specimen is in the Quate collection from Langtang Valley, ca. 60 km N of Kathmandu, Nepal, 2700-3400 m, 13-25.X.1965.

Penthetria japonica Wiedemann

Penthetria japonica Wiedemann, 1830, Aussereurop. Zwiefl. Ins. **2**: 618.
Plecia ignicollis Walker, 1848, List Dipt. Ins. Brit. Mus. **1**: 116.

For a discussion of this species refer to Hardy 1956: 85; 1965a: 6; and to Hardy & Takahashi 1960: 390. Three specimens are in the Quate collection from Syabrubens, 35 km N of Trisuli (Nawakot), Nepal, 1450 m, 30.X-5.XI.1965, and from Bokaihunde, 20 km N of Trisuli (Nawakot), 2100 m, 13-17.XI.1965 (L. W. Quate). Also 2 specimens are in the Janetschek collection, Schuluchtwälder nach Khorila, 3000 m, 27.4 und unterwegs zwischen Ringmo und Tschunbesi, 11.6., (Solu).

Plecia amplitergum Hardy, new species Figs. 1 a-d.

This species runs in the *impostor* complex because of the brown to black discoloration at the anterior portion of the mesonotum. It is differentiated from all known species in this complex by the very large expanded hind tergum and by the bilobed posterolateral margins of the 9th sternum as well as by other characteristics of the male genitalia (figs. 1 b-d). In Brunetti's key to the Oriental *Plecia* (1925: 445) this would run to *tergorata* Rondani, but as discussed by Hardy (1958: 215) the latter species is restricted in distribution to Borneo and Indonesia; the mesonotum is all rufous and the genitalia are very different. These species are not related.

♂. Predominantly black except for rufous notum of thorax. *Head*: Antennae with 7 flagellomeres. The 1st about 1/2 longer than wide and subequal to length of next 2 flagellomeres combined. The apical small, closely joined to penultimate. Rostrum inconspicuous, not noticeably produced. Last segment of palpus nearly 4× longer than wide. *Thorax*: pleura black, tinged with rufous in ground color around wing base and on ventral portion of sternopleuron. Hypopleura rufous, tinged slightly with brown. Pleura principally bare, with short scattered setae in upper median portion of each sternopleuron, and with a few scattered setae on upper portion of mesopleuron and in middle of hypopleuron. Notum, including scutellum, predominantly rufous. Anterior margin of mesonotum, pronotum and humeri dark brown to black; scutellum with a narrow black line extending over apex. Metanotum dark brown to black. Mesonotum opaque, almost devoid of pile, with inconspicuous, short, scattered setae over sides and down dorsocentral lines. Halteres black. *Legs*: Entirely black, covered with black hairs. (I see nothing distinctive about the legs.) *Wings*: Infuscated with gray, tinged with brown in stigma and costal cells. Vein R_{2+3} enters costa at a rather oblique angle to R_{4+5} (fig. 1a) and is situated near basal 1/3 of distance between r-m crossvein and apex of vein R_{4+5}. *Abdomen*: elongate, approximately 2× longer than head and thorax combined, is entirely opaque black covered with dark pile and densely brown pubescent. Large expanded 9th tergum

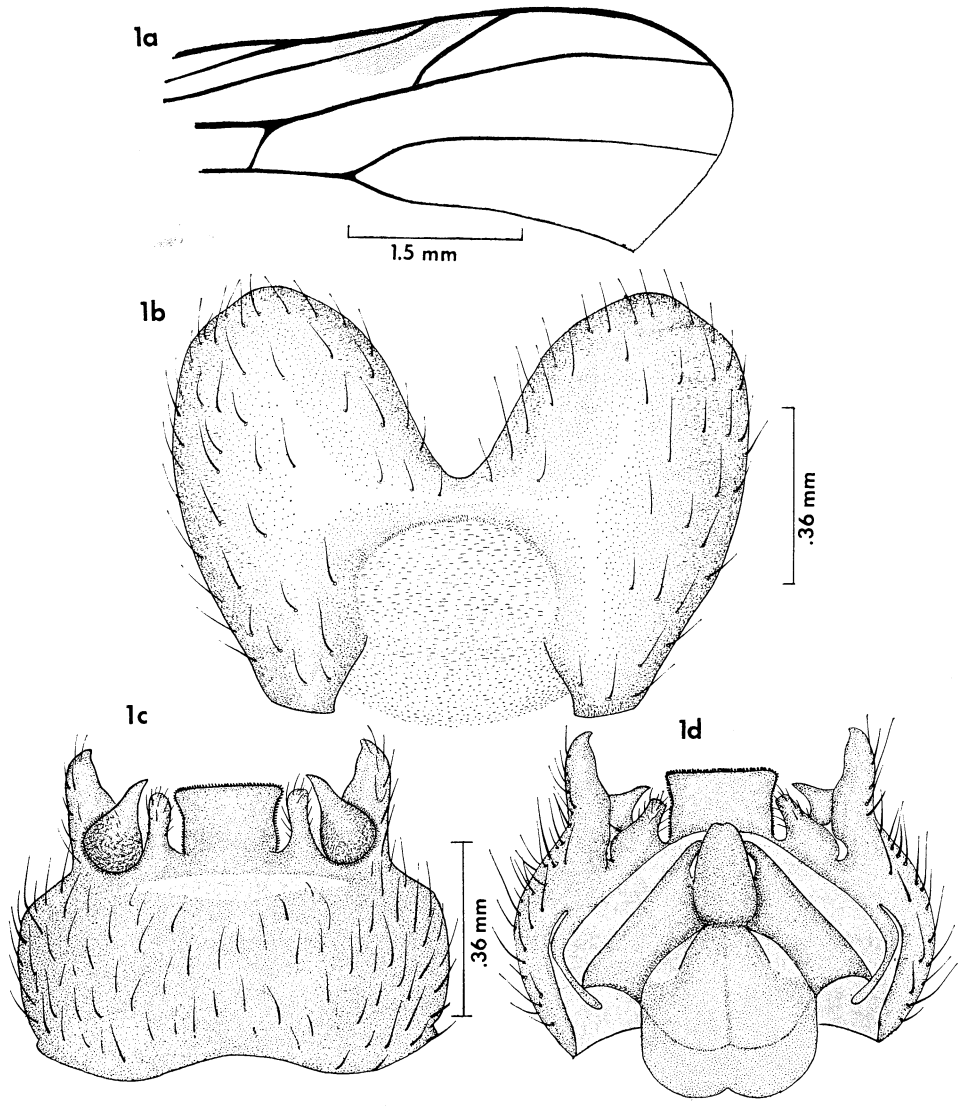

Fig. 1. *Plecia amplitergum* n. sp. a, anterior portion of wing; b, 9th tergum; c, ♂ genitalia, ventral; d, genitalia, dorsal, tergum dissected off.

readily visible *in situ* and species is easily differentiated by this character (fig. 1b). Ninth tergum divided into 2 large rounded lobes each of which is approximately equal in size to 9th sternum. Posterior margin of tergum with a deep V-shaped cleft extending approximately 1/2 length of segment and anterior margin with a U-shaped cleft extending about 1/2 the length of segment. Posterolateral margins of 9th sternum lobate, rather acutely pointed at apices. Lateral lobes extend 2× length of claspers and well beyond submedian lobes and median projection of sternum. Claspers developed into sharp spine-like apices

and each fits closely against base of posterolateral lobe and line of separation from sternum is difficult to discern. A submedian, nearly truncate lobe present on each side of median projection of sternum and extends nearly to apices of claspers. Median projection large, heavily sclerotized, truncate at apex and minutely bristled, giving edges a serrated appearance when viewed under high power (fig. 1c-d).

Length: body and wings, 7.0 mm.

♀. Unknown.

Holotype ♂ (BISHOP 7427), and 1♂ paratype (Univ. Hawaii), Syabrubens, 35 km N of Trisuli (Nawakot), Nepal, 1450 m, 30.X-5.XI.1965, L. W Quate.

Plecia impostor Brunetti Fig. 2a.

Plecia impostor Brunetti, 1912, Rec. Indian Mus. **7**: 446.

I had previously seen only 1 female specimen of this species from Nepal and at that time it was possible to identify it only to the *impostor* complex (Hardy 1965a: 7). Specimens of both sexes are in the collection at hand and the species is *impostor*. This is readily differentiated from all other known *Plecia* by the large velvety-black marking covering the anterior 1/3-2/5 of the mesonotum with the remainder of the mesonotum bright orange. Also, by having the posterolateral margins of the 9th sternum of the male developed into slender lobes and claspers clavate and with prominent basal lobes (fig. 2a). My redescription of this species is adequate (Hardy 1953: 94).

Fifty-four specimens in the Quate collection from Syabrubens, 35 km N of Trisuli (Nawakot), 1450 m, 30.X-5.XI.1965; Bokaihunde, 20 km N of Trisuli (Nawakot), 2100 m, 13-17.XI.1965; and Dunche, 28 km N of Trisuli (Nawakot), 1950 m, 7-12.XI.1965. One specimen in the Janetschek collection from Tal der Liku Kola, Talaus bis Langura Banjang, Lichtfang, 12.6.1961.

Plecia mallochi Hardy?

Plecia mallochi Hardy, 1948, J. Kans. Ent. Soc. **21**: 36. Change of name for *P. confusa* Malloch, 1928, preocc. by *confusa* Loew, 1858, and for *Plecia thoracica* (Guèrin-Mèneville), 1833, preocc. by *P. thoracica* (Fabricius), 1805. For synonomy refer to Hardy 1965a: 8.

Only female specimens have been seen from Nepal and a complex of species may actually be involved. One specimen is in the Quate collection from Pokhara, 910 m, 18-27. IX.1965, in Malaise trap.

Plecia quatei Hardy, new species Figs. 2 b-g.

An all black species which appears to fit close to *assamensis* Hardy (1949: 1) but is differentiated by having the 9th tergum about 2× wider than long and with a distinct V-shaped concavity in middle of hind margin (fig. 2f) and by having prominent lobes developed on each posterolateral margin of the 9th sternum, also the claspers are more curved and beak-shaped at apices (fig. 2g). *P. quatei* is distinctly smaller than *assamensis*, the body length is 4.25-4.5 mm; *assamensis* measures 7.0 mm.

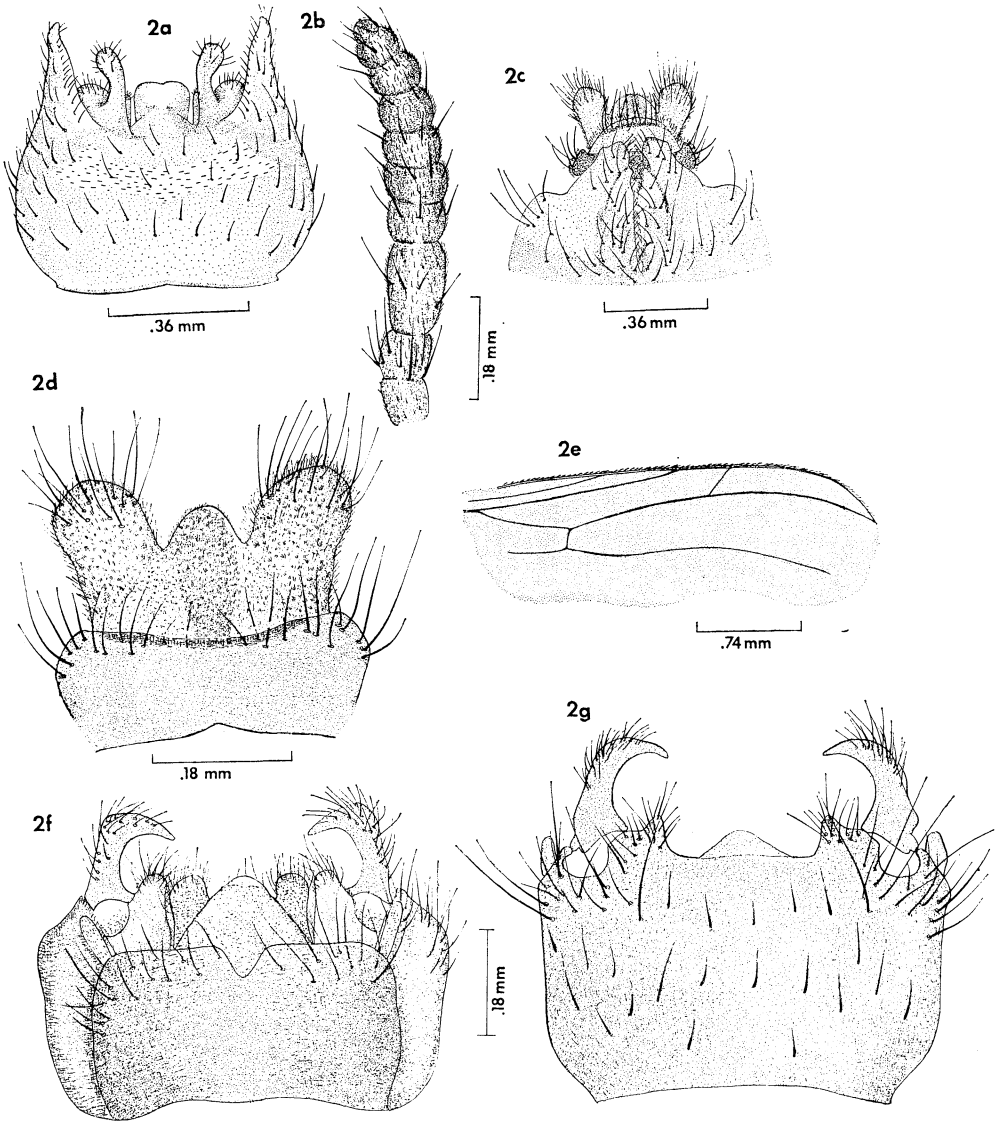

Fig. 2. *Plecia impostor* Brunetti. a, ♂ genitalia, ventral. *P. quatei* n. sp. b, antenna; c, ♀ terminalia, ventral; d, ♀ terminalia, dorsal; e, anterior portion of wing; f, ♂ genitalia, dorsal; g, ♂ genitalia, ventral

In Brunetti's key to the Oriental *Plecia* (1925: 445) *quatei* would run to *aterrima* Brunetti, from the Darjeeling district, India. It is differentiated from this species by having 8 flagellomeres in the antennae in both sexes; in *aterrima* the male has 8 and the female 10; by the last flagellomere being small, shorter than the penultimate; rather than the last distinctly longer than the penultimate. Also, *quatei* is apparently half the size of

aterrima, the body measures 4.25–4.5 mm; Brunetti gave the length of *aterrima* as 8 to 9 mm. The genitalia of *aterrima* have not been studied, they obviously would present distinctive characteristics.

♂. *Head*: Antennae with 8 flagellomeres. The 1st is elongate, equal in length to the next two. The apical tiny, much smaller than penultimate (fig. 2b). Last segment of palpus 3–4× longer than wide and last 3 palpal segments approximately equal in length. *Thorax*: Entirely opaque black covered with black pile. Mesonotum finely shagreened and rather sparsely haired, with long black hairs down each dorsocentral line, on antero-median portion and along sides. Pleura covered with microscopic gray-brown pubescence. Halteres black, tinged with brown at their bases. *Legs*: Shining black except for gray pubescence on ventral aspects of femora and entirely black pilose. Hind basitarsus slightly over 1/3 as long as tibia and approximately 2× longer than 2nd tarsomere. *Wings*: Evenly gray-brown fumose, slightly darker along anterior margin. Vein R_{2+3} short, almost vertical (fig. 2e), arising about 1/2 distance from r-m cross-vein to apex of vein R_{4+5}. *Abdomen*: Entirely black, covered with black pile and with microscopic gray-brown pubescence. Ninth tergum nearly 2× wider than long and with a small V-shaped cleft in middle of hind margin (fig. 2f). As seen from ventral view a rather prominent lobe is present on each posterolateral margin of the 9th sternum and a submedian lobe is present on posterior margin just inside each clasper (fig. 2g). Also a mound-like process is developed on postero-median margin of sternum. Claspers prominent, rather slender and each tapered to a sharp point.

Length: body, 4.25–4.5 mm; wings, 5.0–5.5 mm.

♀. Fitting the description of the ♂ except for primary and secondary sexual characters. Head rather small, eyes oblique in position and portion of head behind eye approximately equal in length to compound eye. Antennae proportioned as in ♂ and palpi with same proportions. Genital characters as in figs. 2 c–d.

Length: body, 4.7 mm; wings, 6.0 mm.

It is a pleasure to name this species after Dr L. W. Quate who is the leading worker on the Psychodidae.

Holotype ♂, allotype ♀ (BISHOP 7428), and 18 paratypes (13♂♂, 5♀♀, BISHOP, USNM, BMNH, Univ. Hawaii) from Langtang Valley, ca. 60 km N of Kathmandu, Nepal, 2700–3400 m, 13–25.X1965, L. W. Quate.

Dilophus gratiosus Bigot

Dilophus gratiosus Bigot, 1890, J. Asiat. Soc. Bengal **59**: 265.

This is a common species in Nepal and has been adequately treated in my previous paper (1965a: 20). Forty-nine specimens are present in the Quate collection from Syabrubens, 35 km N of Trisuli (Nawakot), 1450 m, 30.X–5.XI.1965.

It should be noted that the coloration of the female thorax is variable in this species. Typically the mesonotum is predominently rufous with a black median vitta down the middle. In the series of specimens on hand, it varies from this to predominently shining black, rufous only on the humeri and the sides of the mesonotum.

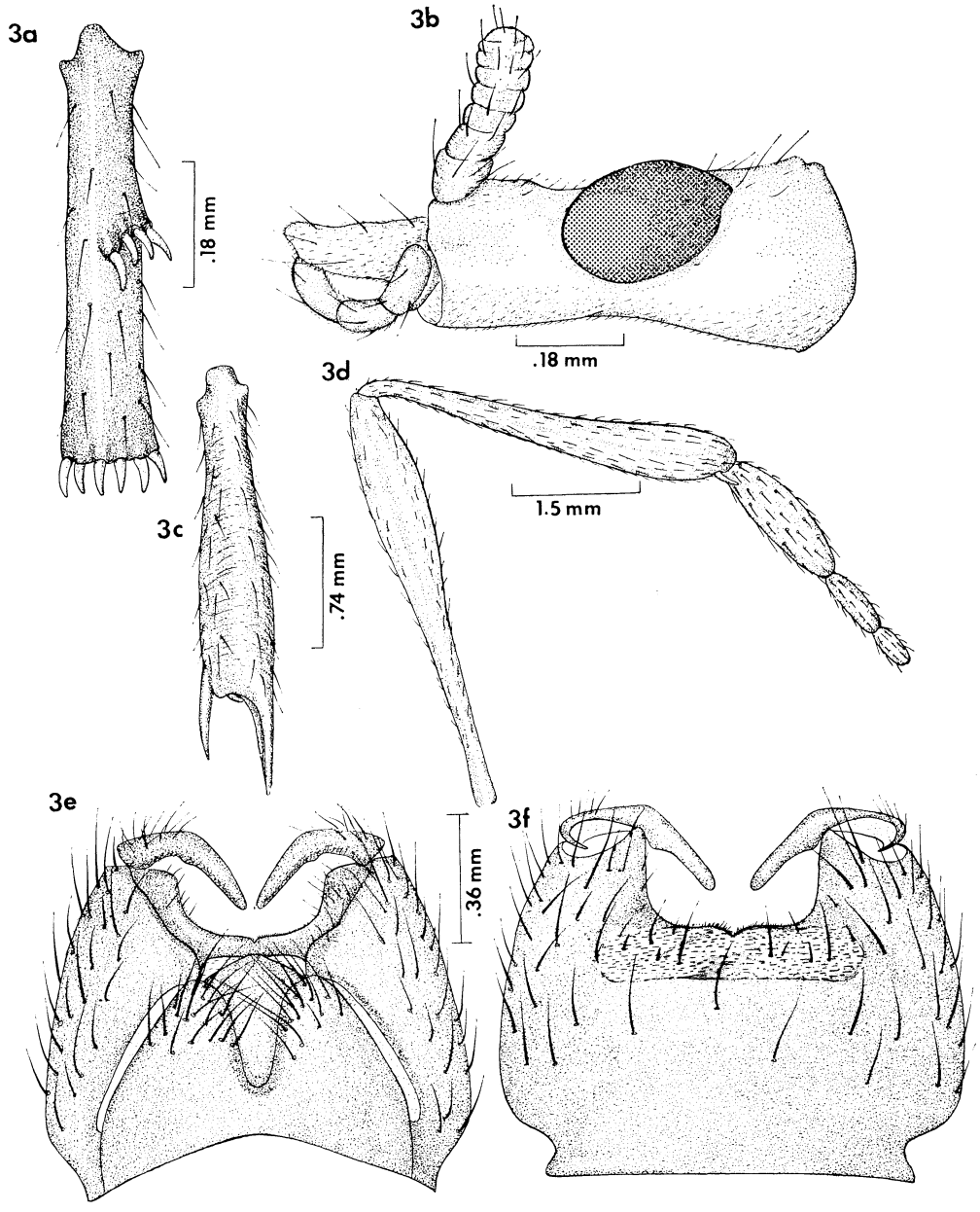

Fig. 3. *Dilophus hirsutus* Hardy. a, front tibia; b, head of ♀, leteral. *Bibio aquilus* n. sp. c, front tibia; d, hind leg; e, ♂ genitalia, dorsal; f, ♂ genitalia, ventral.

Dilophus hirsutus Hardy Figs. 3 a-b.

Dilophus hirsutus Hardy, 1965, Bull. Brit. Mus. (Nat. Hist.), Ent. **16** (1): 22.

This species was described from the male; 2 female specimens are in the Quate collection which obviously fit here. The original description stated that "the head beyond the eyes is very short, completely obscured by the dense black pile of the front of the head." In the male, the rostrum is distinctly produced and is approximately equal in length to the 1st 2 flagellomeres; this is difficult to see, however, because of the long black pilosity. Following is the first description of the female. Thorax shining bright orange except for a black vitta down middle of mesonotum. In 1 specimen, this is rather narrow and extends from the area just in front of the 2nd thoracic comb, posteriorly to a point almost in line with the anterior edge of the wing base. In the other specimen both thoracic combs are entirely polished black and a broad black area extends over the median portion of the mesonotum almost to the posterior margin. Coxae, trochanters and femora yellow to rufous. Rostrum well-developed, sclerotized portion of head in front of compound eyes 2/3–3/4 as long as eye. In one specimen this area is almost entirely yellow, in the other it is brown to black, tinged with yellow. Portion of head behind compound eye about equal in length to eye (fig. 3b). Segments of palpi short and thick, approximately as wide as long except for apical segment which is approximately 1/2 longer than wide. Antennae appear to have 9 flagellomeres, flagellum thickened apically and flagellomeres closely joined. Scape and pedicel yellow, flagellum black. Front polished black, covered with short, inconspicuous, brown setae. Hind portion of head, occiput and rostrum yellow pilose. Thorax sparsely pilose. Spines near middle of front tibia more nearly in a single line than in ♂, the 2 outside spines just slightly displaced (fig. 3a).

The 2♀ specimens are in the Quate collection from Dunche, 28 km N of Trisuli (Nawakot), 1950 m, 7–12.XI.1965, and from Langtang Val., ca. 60 km N of Kathmandu, 2700–3400 m, 13–25.X.1965. 104 specimens are in the Janetschek collection from Mingbo Erst-trip der Hilary Expedition, Hang oberhalb beweidete Zwergstrauch heide, 28.9.61 (Rund 4900).

Bibio aquilus Hardy, new species Figs. 3 c–f.

This species fits nearest to *totonigra* Hardy but is readily differentiated by having the mesonotum polished black, smooth, rather than opaque black, microscopically tuberculated as in *totonigra* (fig. 7f), by having the tibial spurs rufous, rather than black; and wings pale gray, brown only in costal cell and on stigma, with posterior veins tinged with yellow just slightly darker than wing membrane. In *totonigra* the wings are smokey black, dark brown to black anteriorly through the costal cell, cell R1, and upper portion of radial cell; the posterior veins are brown, distinctly darker than the membrane.

♂. Entirely black except for rufous tibial spurs. Body densely black pilose. *Head*: Compound eyes densely pilose, hairs are approximately equal in length to those on front portion of mesonotum. Antennae with 8 flagellomeres, the 1st flagellomere subequal to combined lengths of next 2. Last 2 flagellomeres closely joined, apical shorter than penultimate. Last segment of palpus 4–5× times longer than wide and approximately equal in length to penultimate segment. Rostrum not developed, sclerotized portion of head in front of eyes only slightly visible *in situ*. *Thorax*: Entirely polished black except for a tinge of yellow to rufous on humeri. Mesonotum smooth, with a very faint indication of microscopic wrinkling down sides but not punctulate or tuberculate. Halteres entirely black. *Legs*: front tibiae slender, outer spur about 1/2 as long as remainder of tibia and

inner spur 2/3–3/4 as long as outer (fig. 3c). Front and middle femora rather densely long-haired, hind pair covered with short inconspicuous setae. Hind femur attenuated on its basal 1/2. Hind tibia moderately swollen, at apex about equal in width to thickest portion of femur (fig. 3d). Hind basitarsus swollen, but not as thick as apex of tibia, almost 4× longer than wide and approximately 2× longer than the 2nd tarsomere. *Wings*: Predominantly gray, as seen in reflected light, brown in costal cell and on stigma. Anterior veins dark brown, posterior veins tinged with yellow, just slightly darker than wing membrane. The r-m crossvein slightly over 1/2 as long as basal section of radial sector, venation very similar to that of *nepalensis*. Except for anal vein the posterior veins all reach wing margin. *Abdomen*: Subopaque black, covered with gray-brown to black pubescence. The ♂ genitalia as in figs. 3 e–f. Cleft on hind margin of 9th tergum extends about 2/3 the length of segment.

Length: body, 12.7 mm; wings, 11.2 mm.

♀ unknown.

Holotype ♂ (BISHOP 7429), Langtang Valley, ca. 60 km N of Kathmandu, Nepal, 2700–3400 m, 13–25.X.1965, L. W. Quate. 5 ♂ paratypes (BISHOP, USNM, BMNH, Univ. Hawaii): 3, same data as type and 2, Syabrubens, 35 km N of Trisuli (Nawakot), Nepal, 1400 m, 30.X–5.XI.1965, L. W. Quate.

Bibio araeoceles Hardy, new species Figs. 4 a–g.

This species fits near *B. totonigra* Hardy. It is differentiated by having the pile of the pleura, abdomen, sides of mesonotum and the dorsal surfaces of the femora yellow, rather than the pile of the body and legs being entirely black. Also the last segment of the palpus is 2.5–3.0× longer than wide, rather than approximately 6× longer than wide as in *totonigra*. The tibial spurs are rufous, rather than black. The wings are predominantly gray and except for the brown stigma, only pale yellow brown in the costal cell; the posterior veins are pale brownish yellow, slightly darker than the wing membrane. In *totonigra* the wings are smoky black, dark brown to black anteriorly through the costal cell, cell R1 and the upper portion of the radial cell; the posterior veins are brown.

♂. Entirely black except for rufous tibial spurs and except for yellow on hind portions of humeral ridges. *Head*: Eyes densely pilose. Antennae with 8 flagellomeres, the last 2 closely joined: 1st flagellomere about 1/2 longer than 2nd (fig. 4a). Last segment of palpus 2.5–3.0× longer than wide (fig. 4b). Sclerotized portion in front of head inconspicuous, hardly visible *in situ*. *Thorax*: Brown pilose on dorsum of mesonotum, yellow pilose on sides of mesonotum, scutellum and pleura. Three broad, opaque rugose areas extend down mesonotum; 1 down middle from anterior margin to depressed area in front of scutellum and 1 on each side from a level slightly behind posterior portion of humerus almost to hind margin of mesonotum. These areas are set off by a pair of submedian, shining black, smooth lines extending from anterolateral margins of mesonotum behind humeri to hind margin of sclerite (depressed area before scutellum shiny); also lateral margins of mesonotum smooth and polished black. Rugose areas made up microscopic tubercles which are slightly oblong in shape (fig. 4e). The lower 1/2 of each sternopleuron polished black, wrinkled, upper portion and most of remainder of pleura brown pubescent. Halteres entirely black. *Legs*: Front tibiae not so slender and straight

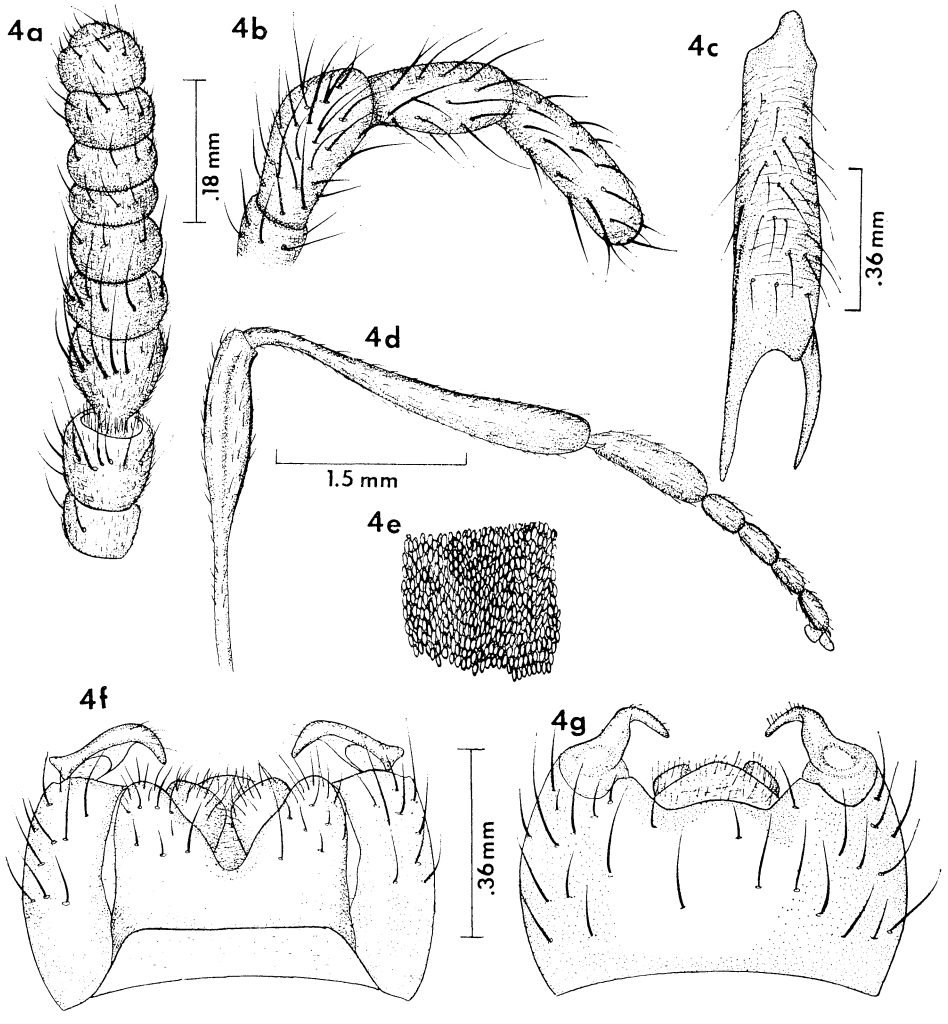

Fig. 4. *Bibio araeosceles* n. sp. a, antenna; b, palpus; c, front tibia; d, hind leg; e, tubercles on mesonotum; f, ♂ genitalia, dorsal; g, ♂, genitalia, ventral.

sided as in most species from Nepal, inner spur subequal to outer (fig. 4c). Basal 2/3 of hind femora attenuated and tibiae also strongly clavate, apices of tibiae slightly larger than femora (fig. 4d). Hind basitarsus swollen but not as thick as tibia and 3.0–3.5× longer than wide and about 2× longer than 2nd tarsomere. *Wings*: Predominantly gray, tinged faintly with yellow as seen in reflected light. Anterior veins and stigma dark brown, posterior veins yellow, tinged faintly with brown. The r-m crossvein equal in length to base of radial sector and costa end just slightly beyond tip of Rs. *Abdomen*: Opaque black, rather thickly yellow pilose especially on sides of terga. Genitalia as in figs. 4 f–g.

Length: body and wings, 6.5 mm.

♀. The anteromedian portion of front not raised, the entire front almost flat, and rugose except for polished black anterior margin. Portion of head behind compound eyes about equal in length to eye. Sclerotized portion in front of eye, measured directly in line with base of palpus about equal to pedicel of antenna. Antenna with 7 flagellomeres, the last 2 closely joined. Thorax sparsely haired, short inconspicuous pile on mesonotum and scutellum entirely dark brown to black. Pile on pleura and abdomen yellow. Legs typical of other ♀ *Bibio*, spurs of front tibia proportioned exactly as in ♂, and hind tibiae and tarsi slender. Wings slightly more fumose than in ♂ with a faint brownish cast as seen in reflected light. In the specimen at hand the r-m crossvein is 1/2–2/3 longer than the base of radial sector.

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

Holotype ♂ (BISHOP 7430), Syabrubens, 35 km N of Trisuli (Nawakot), Nepal, 1450 m, 30.X–5.XI.1965, L. W. Quate. Allotype ♀ (BISHOP) Bokaihunde, 20 km N of Trisuli (Nawakot), 2100 m, 13–17.XI.1965, Quate. Paratype ♂, (Univ. Hawaii), Langtang Valley, ca 60 km N of Kathmandu, Nepal, 2700–3400 m, 13–25.X.1965, Quate.

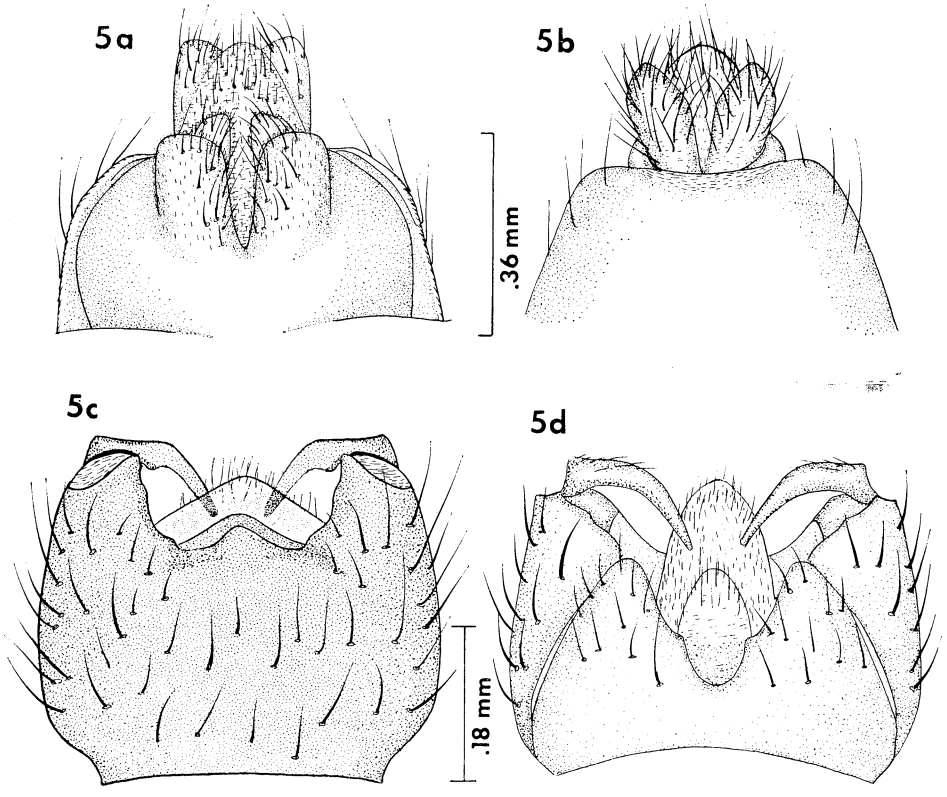

Fig. 5. *Bibio fuscitibia* Brunetti. a, ♀ terminalia, ventral; b, ♀ terminalia, dorsal; c, ♂ genitalia, ventral; d, ♂ genitalia, dorsal.

Bibio fuscitibia Brunetti Figs. 5 a–d.

Bibio fuscitibia Brunetti, 1911, Rec. Indian Mus. **4**: 279.

A series of specimens are on hand from the Janetschek collection and from that made by Swan which appear to be *fuscitibia*. The species was adequately described and figured in my redescription (Hardy 1965b: 211) except for the genitalia. The 9th tergum of the male is almost 2× wider than long and is deeply cleft on the hind margin (fig. 5d). The cleft is V-shaped, rounded on the bottom and extends 2/3 the length of the sclerite. The claspers are slender, slightly curved, pointed at apices. The cleft on the hind margin of the 9th sternum extends about 1/3 the length of the sclerite and is raised into a semimembranous mound on the posteromedian margin (fig. 5c). The 8th tergum of the ♀ is slightly concave on the posterior margin and the cerci are 2× longer than wide (fig. 5b). The 8th sternum of the female is split down the middle, divided into 2 lobes and modified as an egg guide (fig. 5a).

Ten specimens were collected by Prof. Janetschek from the following localities in Nepal: Aufstieg zum Pangpoche zur Taboche-Jak-Alm, 31.V.1961; and Taboche-Jak-Alm, 4590–4730 m, 31.V.1961. A series of specimens have also been seen from East Nepal, S of Barun River, 7.VI.1954, 1300′ (390 m), L. Swan. The latter specimens are in the collection of the California Academy of Sciences.

Bibio nepalensis Hardy, new species Figs. 6 a–g.

In Brunetti's key to the Oriental *Bibio* (1925 : 447) the female specimens would run near *discalis* Brunetti and the male would run to *rufifemur* Brunetti (1911 : 271). *B. discalis* is quite a different species and is differentiated by having the notum of the thorax of the female entirely subshining black except for a narrow rim of yellow along the posterior border, also *discalis* is a tiny species compared to *nepalensis*, the body of the female measures approximately 5.4 mm compared to 14.0 mm. The male of *discalis* is unknown. *B. rufifemur* is also known only from the female so would separate readily from *nepalensis* by the all black thorax, smaller size (length of body 6.0–7.0 mm) as well as probably by many other details. (I have not had an opportunity to study this species.) *B. nepalensis* differs from other known *Bibio* from the Orient which have the inner spurs of the front tibia well-developed and the r-m crossvein over 1/2 as long as the base of radial sector, by having the femora rufous, the tibiae and tarsi black, and the entire thorax of the female rufous.

♂. *Head*: Very densely black pilose, including compound eyes; pile on eyes is almost equal in length to that on front portion of mesonotum. Flagellomeres of antenna and tips of palpi broken off the type. *Thorax*: Predominantly polished, metallic black, integument of mesonotum smooth except for a very slight microscopic wrinkling on sides. Posterior portion of each humerus reddish yellow, anterior edge black. Entire thorax densely pilose. Halteres entirely black. *Legs*: Femora rufous except for extreme tips which are black. Coxae, trochanters, tibiae and tarsi, except for rufous tibial spurs, entirely shining black. Legs black pilose: front and middle femora densely long haired, giving them a very shaggy appearance. Hind femora are, by comparison, sparsely covered with short setae and are slender, attenuated on basal 1/2. Front tibia slender, almost straight sided; outer spur slightly over 1/2 as long as remainder of tibia and inner spur about

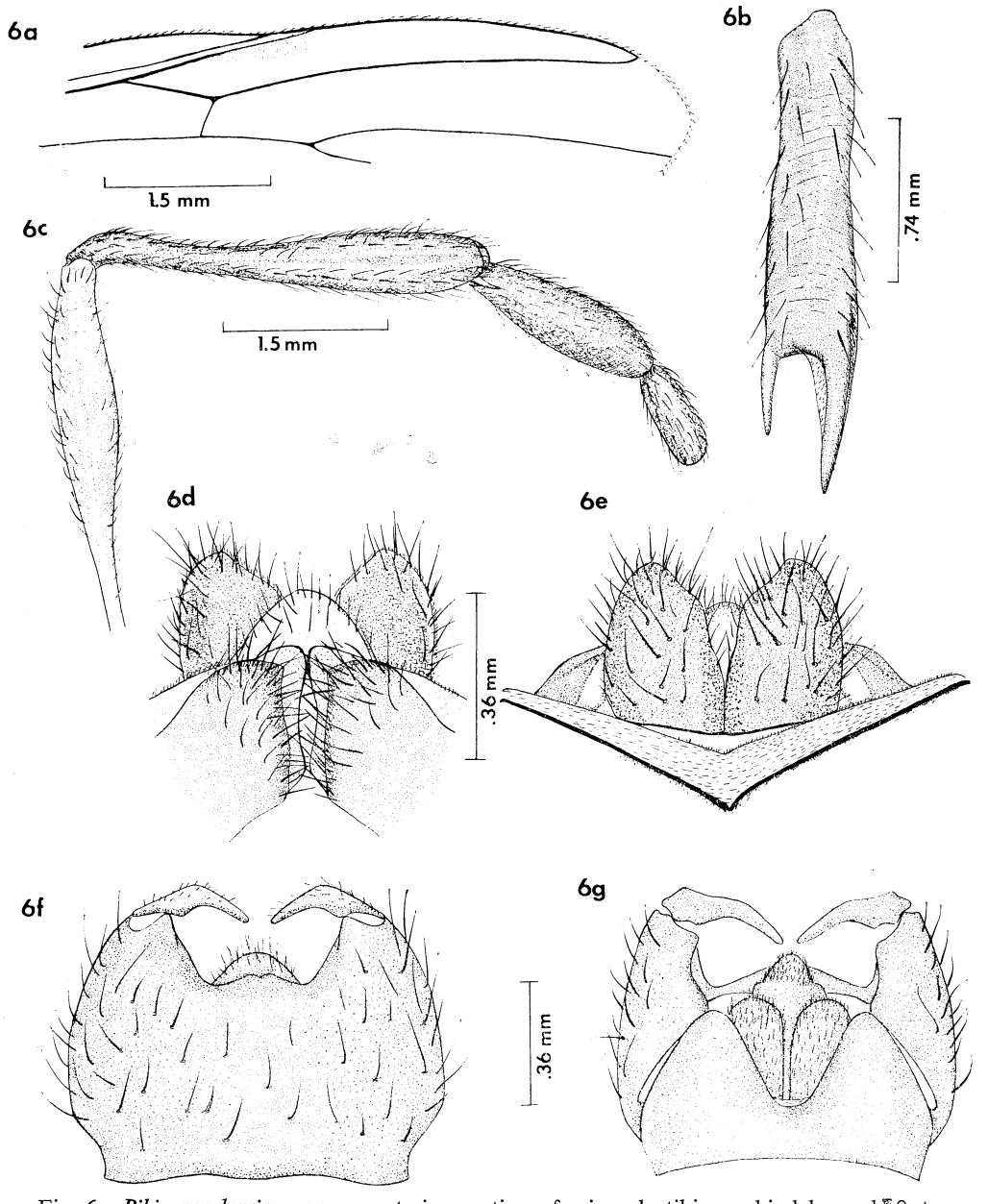

Fig. 6. *Bibio nepalensis* n. sp. a, anterior portion of wing; b, tibia; c, hind legs; d, ♀ terminalia, ventral; e, ♀ terminalia, dorsal; f, ♂ genitalia, ventral; g, ♂ genitalia dorsal.

2/3-3/4 as long as outer (fig. 6b). Hind tibia slightly thicker than femur, a smooth polished black area extends entire length of anterodorsal portion of segment. Hind basitarsus slightly thickened, distinctly narrower than tibia, about 4× longer than wide and 2×

longer than 2nd tarsomere (fig. 6c). *Wings*: Entirely fumose, darker brown along anterior margin. Stigma dark brown. Costal cell and cell R_1 brown and brown coloration extends through upper portions of radial cell and into upper part of cell R_5. Anterior veins brown, distinctly darker than wing membrane. Crossvein r-m slightly over 1/2 as long as basal section of radial sector. Costa ends at apex of radial sector. Vein M_{1+2} branches just before m crossvein. Posterior veins, except for anal vein, all extend to wing margin. *Abdomen*: Dull-black, densely covered with dark pile and microscopically gray-brown to black pubescent. The genitalia are as in figs. 6 f–g. Ninth tergum with a rather deep U-shaped cleft on hind margin which extends approximately 2/3 length of sclerite.

Length: body and wings, 9.25 mm.

♀. Antennae with 9 flagellomeres and rather densely gray-pubescent. Last segment of palpus about 5× longer than wide and approximately equal in length to penultimate segment. Dorsal surface of head roughened, covered with microscopic wrinkles and slightly sunken between eyes. Front distinctly wider than compound eyes. Portion of head behind compound eyes equal to slightly longer than eye. Rostrum, sclerotized portion of head beyond eyes, short, poorly developed, about equal in length to 1st flagellomere of antenna. Thorax entirely rufous except for tinges of black around bases of wings. Mesonotum smooth with microscopic wrinkling of the integument on the sides, as seen under high power (this is not punctulate or tuberculate). Halteres black. Legs colored as in the ♂ except that the coxae and trochanters are also rufous. Other details of leg similar to those of the ♂ except that the hind tibiae are not noticeably thickened, almost straight sided and the tarsi are slender. Wings similar to those of ♂. Genitalia as infigs. 6 d–e.

Length: body, 11.25 mm; wings, 13.5 mm.

Holotype ♂, allotype ♀ (BISHOP 7431), Langtang Valley, ca. 16 km N of Kathmandu, Nepal, 2700–3400 m, 13–25.X.1965, L. W. Quate. Paratype ♀ (Univ. Hawaii), Syabrubens, 35 km N of Trisuli (Nawakot), 1450 m, 30.X–5.XI. 1965, Quate.

Bibio nigerrimus Duda Figs. 7 a–e.

Bibio tenebrosus var. *nigerrima* Duda, 1930, Bibionidae [Fam] 4, pp. 43, 70, Lindner, E., ed., Die Fliegen der Palaearkt. Reg. Vol. **2** (1). [This was spelled *nigerrimus* in the key, page 43, and "nigerrima" in the text, page 70.

For a discussion of the taxonomic status and the description of the male of this species, refer to Hardy (1965a : 14). At this time, I had not had an opportunity to study female specimens.

The female closely resembles *tenebrosus* Coquillett but the outer spur of the front tibia is evenly tapered, not broad, flat and rounded at the apex as in that species. The development of the outer spur of the front tibia is very different in the female than in the male and in my previous key (1965a : 4) the female would not run to *nigerrimus* but would run near *ablusus* Hardy. The females are very much like those of *B. obscuripennis* de Meijere; the outer spur is well developed and sharp pointed in both of these. The only difference I see is that the wing of *obscuripennis* is much darker fumose, distinctly brown with the anterior portion darker in color through the radial cells, and the posterior veins tinged with brown. The wings of *nigerrimus* females are dark gray, brown

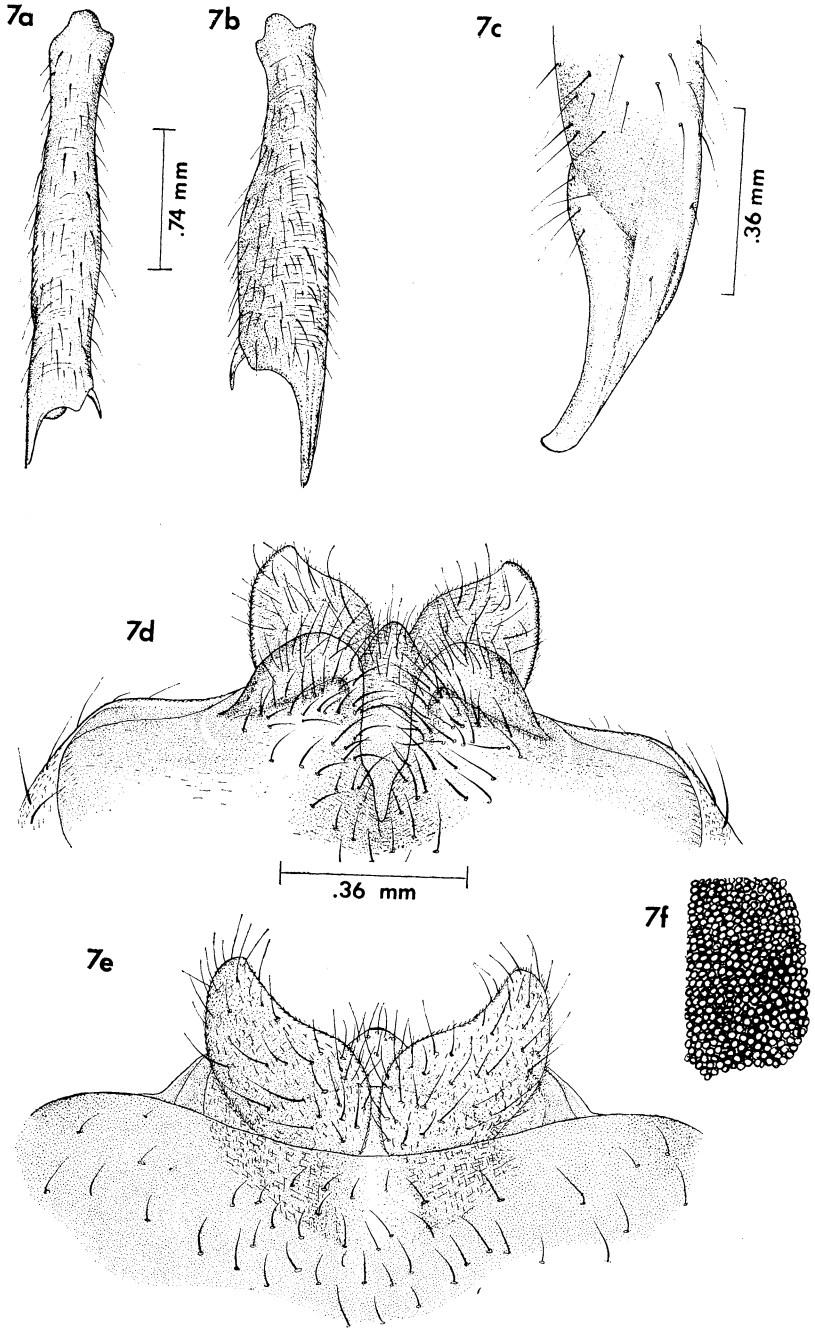

Fig. 7. *Bibio nigerrimus* Duda. a, front tibia of ♂; b, front tibia of ♀; c, apex of front tibia of ♂, lateral; d, ♀ terminalia, ventral; e, ♀ terminalia, dorsal. *B. totonigra* Hardy. f, tubercles on mesonotum.

only in the costal cell and on the stigma and with the posterior veins faintly tinged, just slightly darker than the wing membrane. In the male, the front tibia is slender, almost straight sided, the outer spur is short, characteristically flattened laterally and rounded at the apex (fig. 7c). The inner spur is short compared to most other *Bibio* from Nepal but compared to the outer is about 1/2 its length (fig. 7a). In the female the front tibia is more normal in shape and is slightly expanded before the spurs. The outer spur is almost 1/2 as long as the remainder of the segment and the inner spur is 1/4-1/3 as long as the outer (fig. 7b). The outer spur is not flattened laterally and as seen from side view is evenly tapered to a rather sharp point. As in the male the antennae of the female have 9 flagellomeres and the last segment of the palpus is about 3× longer than wide. The sclerotized portion of the head in front of the eyes is short, measured in line with the bases of the palpi, the length is almost equal to the 2 basal segments of the antennae. The upper portion of the head is predominantly opaque, microscopically tuberculated. The anterior margin of the front is polished black and is raised into a slight keel in the anteromedian portion. As in the male the pile is all black. In the male the mesonotum is divided into 3 distinct rugose areas (opaque black, microscopically puntulated surfaces) separated by 2 submedian, polished black lines extending the entire length of the mesonotum and with the margins shining black. In the female almost the entire notum is opaque, the integument is roughened by microscopic tubercules. In other respects the female fits the description of the male except that the hind tibiae and tarsi are slender, almost straight sided. The female genitalia are as in figs. 7 d-e.

Length: body, 12.0 mm; wings, 13.0 mm.

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