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Psocoptera of Bangladesh Collected by Prof. Emer. Katsura Morimoto, with Descriptions of Four New Species')

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Abstract. This paper reports on the following 8 psocopteran species collected by Prof. Emer. Katsura Morimoto from Bangladesh: *Caecilius nigritiba* sp. nov., *Kodamaius directus* sp. nov., *Amphipsocus mangiferae* sp. nov., *Ectopsocus pilosus* Badonnel, *E. triangulus* Thornton & Wong, *Calopsocus infelix* (Hagen), *Archipsocopsis fernandi* (Pearman), and *Pseudoscottiella morimotoi* sp. nov.

Key words: Taxonomy, Psocoptera, Bangladesh, new species.

Introduction

In this paper, I report on the Psocoptera from Bangladesh. All posicds used in this study were collected by Prof. Emer. Katsura Morimoto in October. 1994 by sweeping and beating of living trees. The material contains 8 species representing 7 genera of 6 families, of which 4 species are newly described. This is the first report of Psocoptera from Bangladesh.

In the synonymy. I include only original descriptions and references after Smithers' catalogue (Smithers, 1967). All specimens were killed and preserved in ethanol. and have spent in it for about two years until here described. The holotypes are deposited in the collection of the Biosystematics Laboratory, Kyushu University (BLKU) and other specimens are in Yoshizawa's collection.

I am grateful to Prof. Emer. K. Morimoto (Entomological Laboratory. Kyushu University) for supplying many valuable specimens and his kind advice. I thank Prof. T. Saigusa and Assist. Prof. B. J. Sinclair (BLKU) for critical review of earlier drafts of this paper, especially the latter who corrected the English version. I also thank Prof. H. Shima and Assoc. Prof. O. Yata (BLKU) for their guidance and encouragement.

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- 1) Contribution from the Biosystematics Laboratory, Graduate School of Social and Cultural Studies, Kyushu University (No. 21).
 - 2) Research Fellow of the Japan Society for the Promotion of Science.

Caeciliusidae

Caecilius nigritiba sp. nov.

Diagnosis. A middle-sized pale psocid. This species is distinguished by its pale yellowish-white body coloration, hyaline fore- and hindwings, and blackish brown antennae, tibiae, and tarsi.

Description. Female. Head pale yellowish white; eye black, IO/D=2.3; ocelli white, ocellar region black. Antenna blackish brown except scape pale brown and pedicel brown. Mouthparts pale brown; maxillary palpus pale except fourth segment brown. Thorax pale yellowish white in ground color; mesoscutum with brown marking on basal region of lateral lobe; mesoscutellum brown laterally; metanotum almost dark brown. Legs pale yellowish white except tibiae and tarsi of all legs dark blackish brown; hind first tarsomere with 15-16 ctenidiobothria. Forewing (Fig. 1A) hyaline with grayish tinge apically; pterostigma narrow; veins hyaline; Rs and M fused for short distance; areola postica nearly semicircular in shape. Abdomen pale yellowish white. Genitalia pale yellowish white: Epiproct (Fig. 1B) densely setose, roundly produced posteriorly. Paraproct (Fig. 1C) with oval field of 20 trichobothria, its ventral margin densely clothed with minute setae. Subgenital plate (Fig. 1D) with straight posterior margin, weakly sclerotized, with faintly pigmented V-shaped area. Gonapophyses (Fig. 1F): Apices of dorsal and ventral valves with minute setae. Spermathecal sac (Fig. 1G) well sclerotized, onion shaped, blackish brown in color.

Length (in mm). Body (B) 2.5-2.6; forewing (Fw) 2.5-2.6; hindwing (Hw) 2.0-2.1; 1st flagellar segment (fl) 0.40-0.45; 2nd flagellar segment (f2) 0.3 1; hind femur (Hf) 0.57-0.6; hind tibia (Ht) 0.90-0.95; hind 1st tarsomere (tl) 0.32-0.33; hind 2nd tarsomere (t2) 0.11-o. 12.

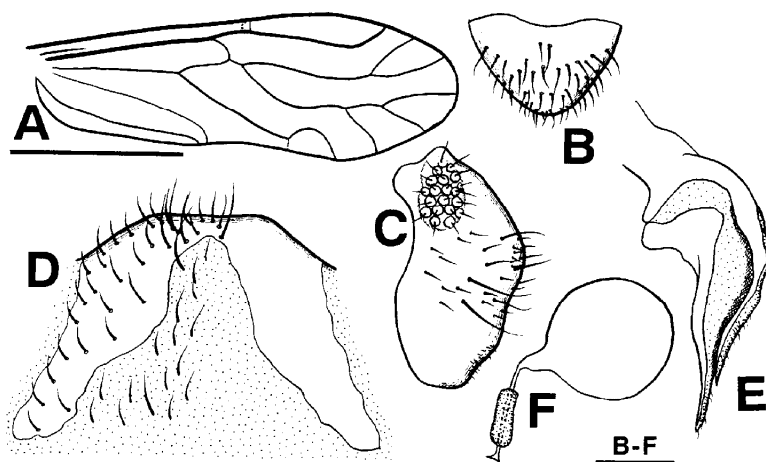


Fig. 1. Female of *Caecilius nigritiba* sp. nov. A, forewing; B, epiproct, dorsal view; C, paraproct, lateral view; D, subgenital plate, ventral view; E, gonapophyses, ventral view; F, spermathecal sac. Scale: 1mm for A, 0.1mm for B-D and F, 0.2mm for E.

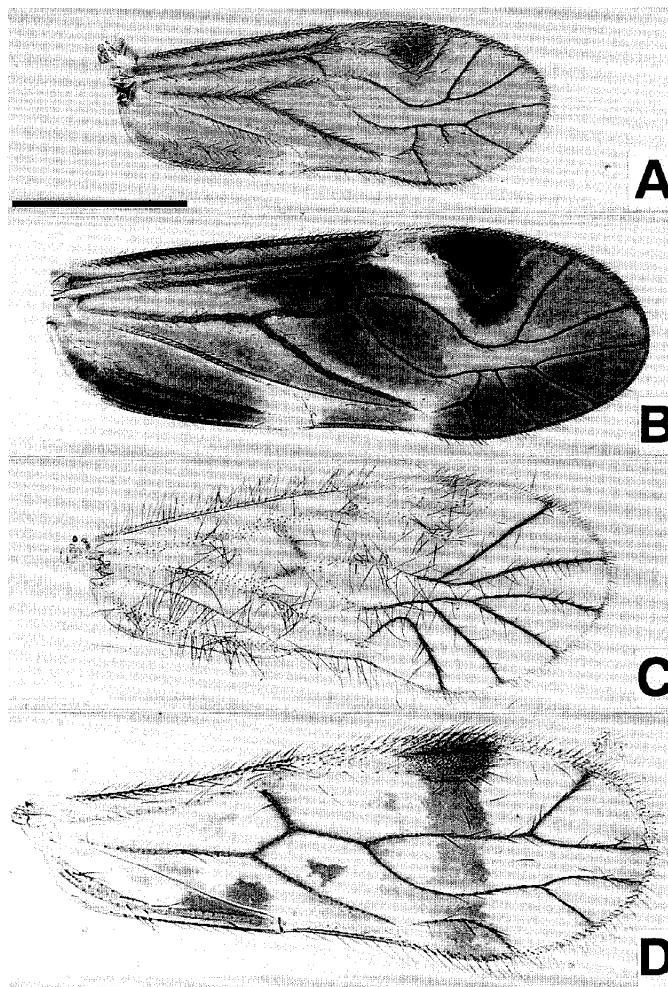


Fig. 2. Forewings. A, *Kodamaius directus* sp. nov., male; B, female; C, *Amphipsocus mangiferae* sp. nov., female; E, *Pseudoscottiella morimotoi* sp. nov., male. Scale: 1mm for A-C, 0.5mm for D.

Male. Unknown.

Material examined. Holotype female, Institute of Postgraduate Study in Agriculture, Gazipur Dist. (IPSA) (Mango tree), 17. x. 1994, K. Morimoto. Paratype: 1 female, same data as for holotype.

Remarks. This new species is similar to *Caecilius hivesi* Vaughan, Thornton & New, 1989, from Indonesia in forewing venation and coloration. However, *C. nigrithia* can be distinguished from *C. hivesi* by pale body coloration and blackish brown antennae, tibiae, and tarsi.

Kodamaius directus sp. nov.

Diagnosis. A middle-sized blackish brown psocid. This species is distinguished by a postero-distally directed second section of the CuA₁ vein of the forewing and a blackish brown spermathecal sac.

Description. Male. Head brown, with irregular dark brown markings on vertex and frons: eye black, IO/D=2.4; ocelli white. ocellar region black; postclypeus with dark brown striae. Antenna broken distal to first flagellar segment in the holotype. only one male specimen; scape and pedicel brown: first flagellar segment dark brown. Mouthparts brown: entire labrum and apical half of fourth segment of maxillary palpus blackish brown. Thorax brown; mesoscutum with dark blackish brown marking on anterior region of anterior lobe. and with large dark brown marking on lateral lobe; mesoscutellum dark brown: lateral lobe of metascutum and entire metascutellum dark brown; meso- and metanotum each with white spot at middle. Legs pale brown; femora paler: second tarsal segments and claws blackish brown; hind first tarsomere with 22 ctenidiobothria. Forewing (Fig.2A) brown, with narrow hyaline area along vein CuP; pterostigma darker in distal half; veins dark brown except CuA₁ hyaline; pterostigma strongly extended posteriorly; Rs and M united at point; angle of top of areola postica almost 90°. Hindwing uniformly brown; veins dark brown. Abdomen brown; eighth venter with pair of triangular sclerites. Genitalia (Fig.3A) dark blackish brown: Epiproct (Fig.3B) small. weakly sclerotized, sparsely setose. Paraproct (Fig.3A) with an oval field of 23 trichobothria and with denticulated field ventro-laterally. Lateral corner of hypandrium densely covered with long setae (Fig.3C). Phallosome (Fig.3D, E) wide; aedeagus strongly arched in lateral aspect; paramere broad basally, strongly arched in lateral aspect; phallobase rounded anteriorly.

Length. B 2.3; Fw 2.5; Hw 2.0; fl 0.60; f2 absent; Hf 0.67; Ht 1.0; tl 0.39; t2 0.12.

Female. Similar to male except as follows: Eye IO/D=2.8. Forewing (Fig.2B) darker, with hyaline areas in basal region of cell R₁, around distal end of vein **CLIP**, and around vein CuA₁; veins Rs and M connected by short cross vein. Hind first tarsomere with 20-21 ctenidiobothria. Genitalia: Epiproct (Fig.3F) with nearly straight posterior margin, sparsely covered with long setae. Paraproct (Fig.3G) with circular field of 23 trichobothria, ventro-lateral region densely setose. Subgenital plate (Fig.3H) rounded apically, widely sclerotized and divided in two parts by narrow membranous region. Gonapophyses (Fig.3I): Dorsal and ventral valves long and narrow. Spermathecal sac (Fig.3J) heavily sclerotized, spherical, and blackish brown in color.

Length. B **3.0-3.5**; Fw **3.0-3.5**; Hw 2.3-2.7; fl 0.52-0.71; f2 0.36-0.48; Hf 0.76-1.0; Ht 1.1-1.5; tl 0.42-0.48; t2 0.14-0.16.

Material examined. Holotype male, IPSA (Mango tree), 17. x. 1994, K. Morimoto. Paratypes: 3 females, same data as for holotype; 3 females, Citrus Research Center, Jaintapus, Sylhet, 30. x. 1994, K. Morimoto.

Remarks. This new species is similar to *Kodamaius besucheti* Badonnel, 1981, from India in forewing coloration, but can be distinguished by the shapes of the areola postica and female subgenital plate, and coloration of the spermatheca.

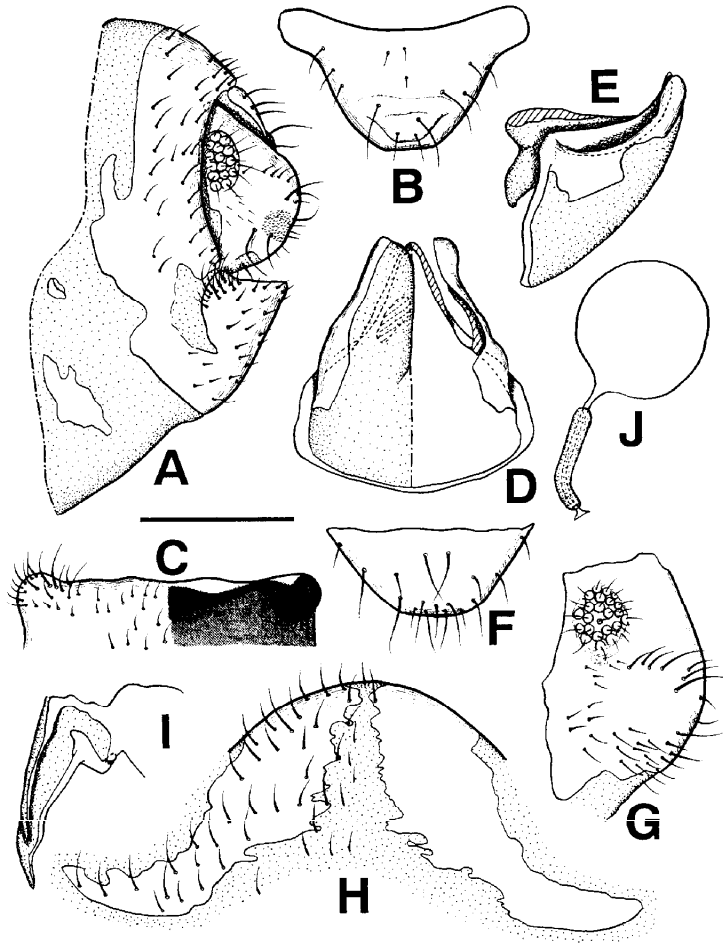


Fig. 3. Male and female genitalia of *Kodamaius directus* sp. nov. A. male genitalia, lateral view; B, male epiproct, dorsal view; C, hypandrium, posterior view; D, phallosome, ventral view; E, lateral view; F, female epiproct, dorsal view; G, female paraproct, lateral view; H, subgenital plate, ventral view; I, gonapophyses, ventral view; J, spermathecal sac. Scale: 0.2mm for A and C-J, 0.1mm for B.

Amphipsocidae

Amphipsocus mangiferae sp. nov.

Diagnosis. A middle-sized pale yellow psocids, densely covered with long setae. This species is distinguished by its broad, rounded forewing, pterostigma without a spur vein, and spermathecal sac with J-shaped neck region.

Description. Female. Head pale yellow, with faint brownish markings on vertex, frons, and around eye; eye black, IO/D=4.4; ocellar region brown. Antenna pale yellow. Mouthparts pale yellow except molar and teeth regions of mandible. apex of lacinia and apical tip of fourth segment of maxillary palpus brown. Thorax pale yellow in ground color; lateral lobe of mesoscutum with brown marking posteriorly; mesoscutellum dark brown laterally; postnotum of mesothorax brown; lateral lobe of metascutum brown; metascutellum dark brown laterally; postnotum of metathorax dark brown. Legs pale yellow, second tarsomeres and claws brown; hind first tarsomere with 14- 16 ctenidiobothria. Forewing (Fig.2C) hyaline, proximal half with irregular faint brown markings; distal half of pterostigma with pale brown marking extending to cell r_1 ; veins white in proximal half, dark blackish brown in distal half except R_1 white; pterostigma strongly extended posteriorly, without spur vein; veins R_s and M fused for short distance or connected by short cross vein; vein M_{1+2} short; areola postica high. Hindwing hyaline with brownish tinge; veins pale to dark brown except CuP hyaline. Abdomen pale yellow except first segment pale brown. Genitalia: Epiproct (Fig.4A) semicircular, with pair of long setae at middle, densely setose along posterior margin. Paraproct (Fig.4B) with circular field of 15 trichobothria. Subgenital plate (Fig.4C) weakly sclerotized, unpigmented, with posterior margin slightly hollowed at middle and bearing long marginal setae. Gonapophyses (Fig.4D): Apicies of dorsal and ventral valves slightly bent outwardly, and covered with denticles; ventral valve almost membranous with short sclerite basally. Spermathecal sac (Fig.4E) sclerotized, nearly spherical, with J-shaped neck region; spermathecal duct short, with very thick glandular structure.

Length. B 2.5-2.8; Fw 2.7-3.2; He 1.9-2.4; fl 0.38-0.43; f2 0.24-0.3 1; Hf 0.57-0.67; Ht 0.95-1.1; tl 0.30-0.34; t2 0.11-0.12.

Male. Unknown.

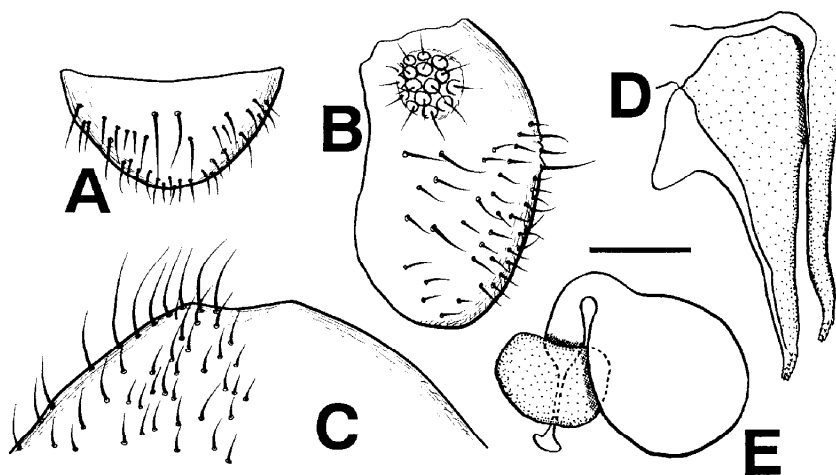


Fig. 4. Female genitalia of *Amphipsocus mangiferae* sp. nov. A, epiproct, dorsal view; B, paraproct, lateral view; C, subgenital plate, ventral view; D, gonapophyses, ventral view; E, spermathecal sac. Scale: 0.1mm for A-C, 0.2mm for D and E.

Material examined. Holotype female, IPSA (Mango tree), 17. x. 1994, K. Morimoto.
Paratypes: 2 females, same data as holotype.

Remarks. This new species is similar to *Amphipsocus heterothorix* Thornton & Wong, 1966, from India in the forewing markings, shape of subgenital plate, structures of spermatheca and gonapophyses, but can be distinguished from *A. heterothorix* by the forewing venation.

Ectopsocidae

***Ectopsocus pilosus* Badonnel**

Ectopsocus pilosus Badonnel, 1968, Faune de Madagascar, 12: 162; Thornton et Wong, 1968, Orient. Ins. Monog., 19: 16.

Diagnosis. Small brown psocid. This species is distinguished by the denticulated posterior margin of the trapezoid apical abdominal tergite of the male.

Material examined. 10 males, 5 females, IPSA (Mango tree). 17. x. 1994, K. Morimoto.

Distribution. Bangladesh; Madagascar, India, Cambodia.

***Ectopsocus triangulus* Thornton & Wong**

Ectopsocus triangulus Thornton & Wong, 1968, Orient. Ins. Monog., 19: 89.

Diagnosis. Very small pale brownish psocid. This species is characteristic in a pair of triangular apical lobes of subgenital plate, inner margins of which are almost parallel.

Material examined. 1 female, IPSA (Mango tree), 17. x. 1994, K. Morimoto.

Distribution. Bangladesh; Malaysia, New Guinea.

Archipsocidae

***Archipsocopsis fernandi* (Pearman)**

Archipsocus fernandi Pearman, 1934, Stylops, 3: 112.

Archipsocus (Archipsocopsis) fernandi: Smithers, 1967, Aust. Zool, 14: 77.

Archipsocopsis fernandi: Thornton, 1984, Treubia, 29: 137; Vaughan, Thornton & New, 1989, Treubia, 30: 77.

Diagnosis. Very small brownish psocid densely clothed with fine setae. This species is distinguished by its forewing coloration, which is hyaline in the basal half and brown in the distal half.

Material examined. 1 female, IPSA (Mango tree), 17. x. 1994, K. Morimoto.

Distribution. Bangladesh; Sri Lanka, Indonesia.

Calopsocidae

Calopsocus infelix (Hagen)

Psocus infelix Hagen, 1858, Verh. Zool. -bot. Ges. Wien, 8: 475.

Calopsocus infelix: Hagen, 1866, Verh. Zool. -bot. Ges. Wien, 16: 204; New, 1978,

Orient. Ins. 12: 305; Thornton & Smithers, 1984, Syst. Ent. 9: 188.

Calopsocus hageni New, 1978, Orient. Ins., 12: 309.

Diagnosis. A middle-sized psocid with reddish head and blackish brown body. Forewing elytriform. This species is distinguished from other species of the genus by having more than one cross vein in the central region connecting R and M veins of the forewing.

Material examined. 4 males, 8 females, 10 nymphs, IPSA (Mango tree). 17. x. 1994. K. Morimoto.

Distribution. Bangladesh; Sri Lanka, Malaysia, Singapore, Borneo. Java, New Guinea, New Britain.

Pseudocaeciliidae

Pseudoscottiella morimotoi sp. nov.

Diagnosis. Small-sized whitish psocid. Hyaline forewing with brown markings. This species is distinguished by a pair of long processes arising from the dorsal margin of the male clunium and by a bare and less developed apical process of the female subgenital plate.

Description. Male. Head white in ground color, with pale brown long setae: coronal suture black; vertex with pair of brown markings; frons with brown marking at middle: gena brown; antennal socket narrowly bordered with brown; postclypeus with pale brown striae; anteclypeus white; eye black, IO/D=1. 1; ocelli white. Antenna uniformly pale brown. Mouthparts almost white; labrum brown; fourth segment of maxillary palpus pale brown. Thorax: Prothorax brown. Meso- and metapleuron uniformly brown except membranous regions white. Meso- and metanotum white in ground color: mesoscutum with dark brown marking on anterior lobe, and with brown marking on lateral lobe: mesoscutellum brown; metascutum with brown marking on lateral lobe: metascutellum and postnotum brown. Legs pale brown; middle and hind coxae darker: claws black: hind first tarsomere with 11 ctenidiobothria. Forewing (Fig.2D) hyaline: brown band from distal portion of pterostigma to distal portion of aleola postica; large brown marking on distal ends of cells cup and an, extending to cell cua; small brown markings in cell br. r_1 , and m; veins brown except R_1 , CuA_1 , and CuP white; R_s and M fused for long distance, nearly subequal in length to R_{2+3} ; areola postica flat and long. Hindwing hyaline, veins pale brown. Abdomen white with longitudinal irregular blackish bands laterally. Genitalia (Fig.5A, B) dark brown: Clunium with pair of narrow, long processes arising from distal margin of dorsum, with minute process arising inbetween: long process weakly curved in lateral aspect, directed postero-ventrally; apex of long

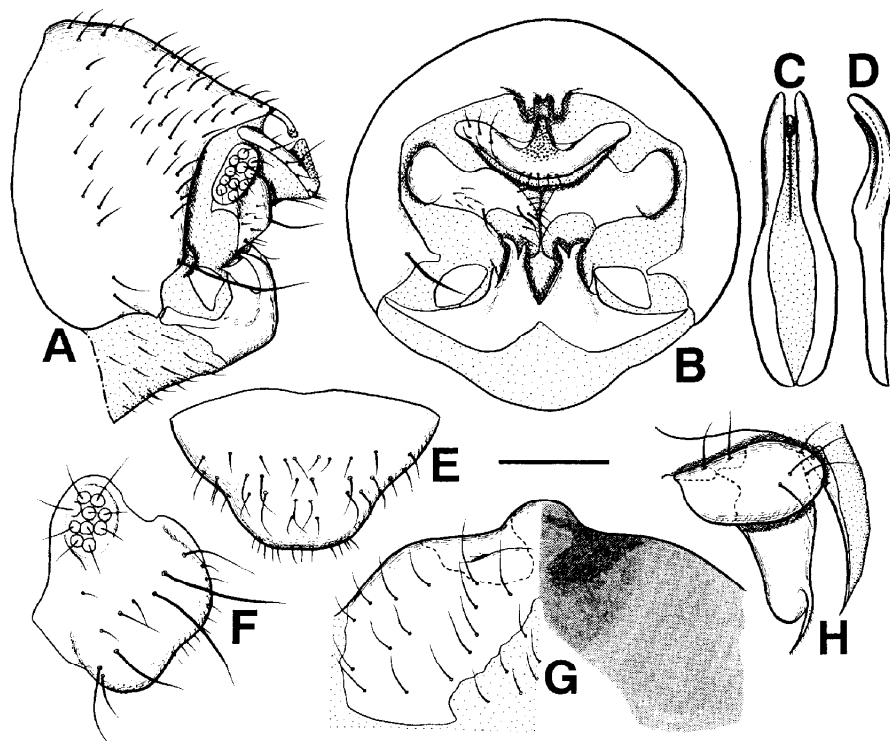


Fig. 5. Male and female genitalia of *Pseudoscottiella morimotoi* sp. nov. A, male genitalia, lateral view; B, posterior view; C, phallosome, ventral view; D, lateral view; E, female epiproct, dorsal view; F, female paraproct, lateral view; G, subgenital plate, ventral view; H, gonapophyses, ventral view. Scale: 0.1mm for A and B, 0.2mm for C and D, 0.3mm for E-H.

process covered with denticles. Epiproct with triangular process at middle, covered with denticles. Paraproct with oval field of 11 trichobothria. Hypandrium well sclerotized, with pair of long processes posteriorly; each process with forked tip; large triangular or oval sclerite between clunium and hypandrium. Phallosome (Fig.5C,D) narrow: aedeagus and paramere weakly arched in lateral aspect; phallobase divided anteriorly; radula without any sclerite.

Length. B 2.1; Fw 1.8; Hw 1.4; fl 0.40; f2 0.24; Hf 0.38; Ht 0.64; t1 0.21; t2 0.10.

Female. Similar to male except as follows: Head without brown markings on vertex, frons, and gena. Eye IO/D=4.7. Hind first tarsomere with 11 ctenidiobothria. Genitalia brown: Epiproct (Fig.5E) with long setae on distal half. Paraproct (Fig.5F) with oval field of 10 trichobothria. Subgenital plate (Fig.5G) with reduced, semicircular and unisetose apical lobe. Gonapophyses (Fig.5H): Ventral valve gradually tapered to pointed apex; dorsal valve with apical lobe and long, slightly curved subapical process; external valve oval, sparsely covered with long setae.

Length. B 1.9-2.0; Fw 1.7-1.8; Hw 1.3-1.4; fl 0.29-0.33; f2 0.19; Hf 0.36-0.38; Ht 0.60-0.62; t1 0.18-0.19; t2 0.08-0.09.

Material examined. Holotype male, IPSA (Mango tree), 17. x. 1994, K. Morimoto. Paratypes: 2 females, same data as holotype.

Remarks. This new species is very similar to *P. urbana* Vaughan, Thornton & New, 1991, and *P. nigroguttatus* (Karny, 1925) from Indonesia in forewing markings and female genitalia, but can be distinguished from *P. urbana* by the faint brown marking around the proximal end of vein Rs+M, and from *P. nigroguttatus* by the less developed forewing markings and shape of the subgenital plate.

It is often considered that the African species of the genus *Pseudoscottiella* Badonnel are considerably different from the Oriental, Pacific and Australian species (Thornton et al., 1972; New, 1974; Yoshizawa, 1996). However, *P. morimotoi* has the following character states that suggest close affinities with African species: clunium with pair of dorsal processes; hypandrium well sclerotized and with lateral sclerites; phallosome without rod-like sclerite on radula; apical lobe of subgenital plate less developed and bare. Although males of *P. urbana* and *P. nigroguttatus* are unknown, forewing markings and shape of the subgenital plate suggest that these two species are closely related to *P. morimotoi*, and consequently also related to the African species group.

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